

MEASUREMENT AND
ADJUSTMENT SERIES

EDITED BY LEWIS M. TERMAN

PSYCHOLOGICAL
SERVICE
FOR SCHOOL
PROBLEMS

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IN his famous judgment concerning the motherhood of an infant, Solomon did not make an arbitrary decision or one based on tradition. He made a psychological analysis of the situation, which led to an entirely satisfactory solution. And all Israel feared the king, for they saw that wisdom was in him to do judgment. The solution of problems affecting children, and particularly school children, can be of value only if based on sound psychological study of all the influencing factors. To aid in such study, to help the individual or the staff upon whom the solution of school problems devolves, in whole or in part, is the purpose of *Psychological Service for School Problems*.

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PREFACE

EDUCATION implies more than teaching or the supervision of instruction. Modern practice places increased emphasis on child study and pupil adjustment. The educational process implies, on the one hand, modifications to be made in child behavior and all that is involved in pupil instruction; on the other, the child himself and all that is involved in learning. Too generally the child has been subordinated in the process. The application of psychological principles to educational problems is effecting a closer alliance between learning and teaching.

The establishment of facilities for psychological service and the application of measurement techniques might appear to be a thinly disguised attempt to effect a new kind of standardization of educational procedure, another formal method of dealing with pupils. The psychological service to be described need not entail standardization of educational products and the circumscribing of pupil activity, provided intelligent use is made of the data such service affords. Properly applied, the results of psychological service lead to greater freedom for the individual, conservation of his talents, fostering of harmonious adjustments, opportunity for achievement commensurate with the individual's needs and abilities, and increased happiness and ultimate satisfaction to the individual.

Not every service that psychology offers to education is described in these pages, nor is there any attempt to set forth the general principles of educational psychology. The treatment is limited to the more specific types of psychological service most closely related to pupil observation and adjustment. The psychology of methods and of curriculum construction, the laws of learning, are discussed only in connection with pupil problems and educational applications.

The functions of school psychologists rather than the functions of teachers or supervisors will receive major emphasis.

The material has been prepared for three groups of readers: (1) school administrators; (2) psychologists, child-study specialists in service, and students in training; and (3) the school patron or general reader who studies or otherwise keeps in touch with progressive educational practice. The administrator often finds it difficult to gain from scattered references assistance in utilizing psychological service effectively and in coördinating it with functions of administration and instruction. Much of this reference material is here brought together, summarized, and evaluated.

For the prospective psychologist with training in psychological measurement, special education, clinical psychology, and statistics this material furnishes assistance in the application of knowledge gained in courses in theory. One of the major purposes of the book is to reduce the large amount of trial and error experienced by psychologists and child-study specialists in functioning in the school situation.

The material is organized in such a way as to describe the implications of psychological service for educational institutions, both from the point of view of actual practice and expert opinion; progressive movements in education which have created the need for psychological service; and, in more detail, the actual work of administering psychological service in the schools.

It is impossible to include within one volume the problems that arise in connection with psychological service in all grades from the nursery school through the college, and in the many types of schools and institutions. The activities of psychologists in orphan asylums, state departments of education, and private and state institutions for exceptional children require separate treatment. The field of the present volume has been confined to psychological service in the

elementary and junior high school grades of public and private schools for presumably normal children, the ages of such children varying from five or six to fourteen or fifteen years. The principles apply equally well to the senior high school. Within these restrictions a broad rather than a narrow interpretation of psychological service is presented.

I wish to express my appreciation to Professor Rudolf Pintner, Professor Elizabeth D. McDowell, and Professor Ruth Strang of Teachers College, Columbia University, and to Dr. John R. Clark and Dr. Adelin White Scott for helpful criticism of the manuscript. Colleagues at the Lincoln School have offered many suggestions that have been incorporated in the text. Dr. Lewis M. Terman, editor of the *Measurement and Adjustment Series*, and Dr. J. S. Orleans of the World Book Company have given invaluable service in the preparation of the manuscript for publication.

GERTRUDE HOWELL HILDRETH

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EDITOR'S INTRODUCTION

THE child-centered school so eloquently argued for by Stanley Hall for nearly half a century, and by John Dewey for forty years, is at last becoming the recognized ideal of American education. The effects which this ideal is exerting upon educational practice promise, as Hall long ago predicted, to be as revolutionary as was the substitution of the Copernican for the Ptolemaic theory in astronomy. The newer conceptions in regard to the psychology of childhood are modifying not only teaching methods, but also our educational goals and the curriculum contents through which the goals are to be achieved.

It is true that the methods of child study with which Hall and his earlier students worked are no longer in use and that the term "child study" is becoming somewhat obsolete, but this does not mean that study of children has ceased. The truth is that millions of dollars are now being expended annually in child research, as compared with a few thousands forty years ago, and that the number of trained workers in this field has multiplied many times. Child study, in the scientific sense of the term, was never so alive or so potent in its influence upon education as it is today. Hall's hope that prospective teachers would some day be universally instructed in the principles of child psychology and that teachers in service would be kept informed of the more important current developments in the field is already well on the way to realization. The employment of school psychologists is no longer a novelty. Research departments are rapidly spreading even to schools of moderate size. Everywhere one finds a more or less clear recognition of the principle that no educational procedure may safely ignore the facts of child development or fail to take full cognizance of individual differences in pupils.

Thus far, however, the pursuit of child psychology in the schools has been unfortunately limited in scope. Too often the department of research has confined its activities almost entirely to the administration of standard tests and the classification of pupils for instruction. These are important functions, but they fall far short of fulfilling all the purposes of educational psychology.

One of the chief aims of this book by Dr. Hildreth is to give a broader conception of the work that should be carried on in this field. It is intended not merely as a guide for use by school psychologists, although it should prove extremely useful for this purpose, but also as a text for acquainting teachers and school principals with the aims, methods, and scope of psychology in its applications to the school situation.

Besides the administration of tests and the classification of pupils there are many other contributions which the psychologist can make. The construction of a curriculum must be guided largely by a consideration of the child's interests and of his developing capacities. Remedial teaching presupposes a knowledge of the psychology of special defects and special abilities. Educational and vocational guidance must be based upon definite psychological data. The work of the school counselor is from first to last psychological. The clinical study of problem children can get nowhere without the application of psychological methods. Parent education, which more and more is coming to be recognized as an important function of the school, should be based largely upon the psychology of childhood.

All these and various other functions of the school psychologist have received sane and careful treatment by Dr. Hildreth. Her aim has been to make this book practical rather than theoretical, and her extensive experience has enabled her to realize this aim to an unusual degree. *Psychological Service for School Problems* treats of problems about which

teachers in general should have some knowledge, and for this reason the book should find a wide field of usefulness as a text in the professional training of teachers and in reading circles for teachers in service.

LEWIS M. TERMAN

PSYCHOLOGICAL SERVICE FOR SCHOOL PROBLEMS

CHAPTER ONE

PSYCHOLOGY APPLIED TO EDUCATIONAL PROBLEMS

In progressive schools the application of psychological principles and techniques to the study of educational problems is considered indispensable for the improvement of instruction and pupil adjustment. The scientific study of child activity has become a function of major importance. Formerly, functions of school administration and pupil instruction had little connection with child study. They are now inextricably associated with it.

THE IMPORTANCE OF PUPIL STUDY

Someone has said that the wealth of the human race lies not in oceans, soil, or sunlight, but in the mind of man. Imperfect and inadequate mental functioning result in inestimable loss to society. Part of this loss is attributable to maladapted educational procedures and failure on the part of educators to study the present and future needs of pupils. Problem pupils are often the result of insufficient knowledge on the part of adults of the characteristics and capacities of children. Many children retain infantile habits long after they should normally have discarded them. Others fail to accomplish all that might reasonably be expected of them. The causal factors in the case of problem children capable of normal adjustments lie primarily in neglect or superficial education.

The human being is dynamic, not static. He is constantly reacting to a changing environment with a developing and maturing mental and physical equipment. It is in this interplay between environmental factors and personality

that problem situations arise, some of which become so serious as to require the assistance of specialists in mental adjustments; but many of the minor problems could be handled more satisfactorily with a better understanding of psychological procedures on the part of the teacher and the parent.

Many educators overlook the fact that teaching is not effective unless the pupils are learners. This fact has a number of important implications. It implies, in the first place, the need of discovering the facts about the learning capacity of each individual pupil, his interests, attitudes, special abilities, and defects. In the second place it implies the need of supplying the best conditions for the fullest development of which each child is capable. Teachers undertake their work most profitably only after these conditions have been met. The extent to which the pupils are making suitable adaptations in the school situation indicates the adequacy of the school system in meeting pupils' needs.

PROBLEM OF THE SCHOOL FAILURE

The futility of trying to modify the behavior of young children in certain specified directions without taking account of the ability, needs, interests, and desires of the pupils themselves, or of the laws by which modifications most readily and economically take place, has been demonstrated since the time of the first "school failure." The extravagant waste in the education of repeaters and particularly of mental defectives, the ill-adapted preparation of the child who drops out of school as soon as the law allows, the failure to conserve and utilize the talents of the gifted, the negligence and ignorance shown in the treatment of the unstable child, the blunders of mass instruction, all indicate the inadequacy of many educational institutions in meeting pupil and social needs.

Can school failures be prevented? It is estimated that about a third of the 4,000,000 children who enter the first grade each year fail of promotion to the second grade because of mental immaturity, physical or mental defect, poor background, peculiarity of temperament, or the like. A large number of first-grade entering pupils have not reached the stage in mental development where they can succeed with first-grade work as it is commonly organized in the average public school. These repeaters, it is estimated, cost the school annually from seventy-two to eighty dollars a pupil, according to estimates of the United States Bureau of Education. A campaign has been undertaken to make preliminary mental and physical examination of all beginning school pupils before the school term opens. Reduction of the percentage of school failures by means of classification and remedial work following testing programs has been reported by Arthur (42)¹ and by Dickson (59).

The elimination of school failures will, however, not solve all educational problems. The larger task is that of adjusting the work of the school to the requirements of all pupils.

THE NEED FOR PSYCHOLOGICAL SERVICE CREATED BY
PROGRESSIVE DEVELOPMENTS IN EDUCATION

Fifty years ago there was no psychological service for schools comparable with that to which the modern educator has access. The present need for such service is an outgrowth of new developments in educational theory and practice. These developments have been primarily in two directions:

1. Changing conceptions in educational theory, resulting in altered practice.
2. Developments in experimental psychology and the

¹ Italic numbers given in parentheses throughout the book refer to the items in the Bibliography, pages 259-279.

resulting application of the scientific method to education.

Changing conceptions of education have been in part the cause and to some extent the result of the new interest in the child, his present and future needs, as an important factor in the educational process.

The newer educational philosophy emphasizes two principles of paramount importance for an understanding of present educational trends. These are, first, the importance of the child as the center of the educational process, and second, the justification for democratic as opposed to aristocratic schemes of education. The first of these points of view stimulated interest in child study and research in child behavior; the second justified universal tax-supported schools, which afforded an opportunity for every child to obtain elementary and higher education. The application of these principles necessitated wholesale revision of methods of teaching and curriculum construction. They have brought into the foreground of educational practice a multitude of problems which formerly did not exist.

The emphasis on education as a process of child development and adjustment necessitated the discovery of the characteristics of children and provided a new basis upon which to evaluate educational methods and curricular materials.

THE CHILD THE CENTER OF THE EDUCATIONAL PROCESS

Since the process of education is now recognized as something to be identified with the child's interests and purposes rather than as something external to or imposed upon them, we need to know more about the child's nature and habits than has been known in the past. The logical order in educational theory and practice involves consideration of the child first — how he is constituted; how he learns, acts, thinks; what his capacities are, his tendencies, his abilities

and aspirations, habits and defects. Having these data, the educator is in a position to ask: Now, what can the child become; what are his limitations and possibilities for training? What are the best methods of realizing these aims, the best techniques and materials to employ? Such a procedure is better than to set up, *a priori*, such a goal as, "All children should be taught to read and write when six years of age," only to struggle with a particular child to the age of nine before realizing that the child may never be able to recognize more than a few of the simplest words; or to adopt the slogan, "A high school education for every boy and girl," only to realize that with the customary inflexible program found in many small high schools this goal is impossible of attainment.

INDIVIDUAL DIFFERENCES DISCLOSED BY MASS INSTRUCTION

The second educational doctrine that has increased the need for psychological study of school children is the idea of universal education — the notion of democratic as opposed to aristocratic educational schemes. This doctrine, developing from sociological theories of the eighteenth century, had an early influence upon educational institutions in the United States. The hue and cry of early American educators was universal education for the preservation of the democratic institutions of the land. According to the philosophy of Dewey (367), however, the justification of a democratic scheme of education lay in the inalienable right of every child to an education, that right inherent in the child himself. To withhold from the child, or from certain groups of children, adequate opportunity for the development and progress of which they were capable came to be recognized as an injustice to the child.

Compulsory education laws disclosed the motley character of the child population. Extreme individual differ-

ences in background, talent, interests, and purposes were more apparent than before. It remained for the psychologist to detect the less readily discernible differences and to evaluate them in the light of supplementary information for the better instruction of the child and improvement in his adjustments.

With the growth of city school systems mass instruction rapidly replaced individual methods. Difficulties at once arose. Large numbers of pupils could not keep the pace set by the majority. Others could scarcely be kept busy. Pupils had to be promoted by chronological age; otherwise they outgrew their desks. Efforts to break the lockstep resulted (330). The first attempts sought to segregate children of different achievement into ability groups with the intention of making a concentrated effort to bring them up to grade and to return them to the regular classes. There was little recognition of a need for differentiation of instruction and curricula for pupils of varying ability. Soon it became apparent that giving more attention to the less able pupil than to the average child would not entirely solve all the problems that arose.

The presence in the schools of children of greatly varying capacities and interests necessitated the services of specialists trained in psychology to assist in studying the problems arising in instruction and individual adjustment. There was need for a better interpretation of behavior deviates and for experimentation to determine the best means of meeting their needs. Backwardness and retardation were so long believed to be due to physical defect, lack of effort, or to disinclination that little progress in the education of backward and retarded children was made until psychologists revealed the true nature of the problem. It was soon demonstrated that the removal of physical defects was not always efficacious in eradicating mental backwardness, that extra

stimulation would not usually make a dull child equal to a normal one, that mental and physical defect together were often only the symptoms of degenerate stock. Disinclination and lack of effort came to be recognized as the result rather than the cause of feeble-mindedness.

It was quite apparent that the detection of deviates required the services of experts as did proper provision for their educational welfare. Effective classification of pupils in ability groups could not proceed in haphazard fashion but could be undertaken only by educators who had studied the situation thoroughly, could see the problem as a whole, and could intelligently evaluate objectively determined information concerning school pupils.

THE CHANGING CURRICULUM

A changing conception of the curriculum has paralleled the discovery of the true nature of the variety and extent of individual differences among school children. So long as the school population consisted only of the intellectually and socially élite who were destined for college, the disciplinary conception of the worth of certain studies in the curriculum prevailed. The more abstract studies could be included with a large chance that some transfer and generalization would result or that such subjects would actually have utilitarian value for the learner. With the increase in the heterogeneity of the population the defects of the theory have become apparent, and modern psychological investigations have revealed its limitations. A complete reorganization of the curriculum has become necessary. The basis for reorganization in the most progressive schools has not been some preconceived notion of what is good and best, but it is based upon actual study of the child and a consideration of his present and future needs.

DEVELOPMENTS IN PSYCHOLOGY WHICH RESULTED IN
APPLIED EDUCATIONAL PSYCHOLOGY

Extensive revision of educational procedure has resulted from experiments in educational psychology; and the application of the results of experimentation to education has effected fundamental changes in the educational process. Psychological service for schools would scarcely have been possible in the past without modern experimental psychology.

The advent of applied educational psychology is associated with progress in psychology as a science of human behavior. At first attention was concentrated on the study of the senses and mental processes. Later in France and in America attention became more largely centered on the study of total personality and the functioning of the whole individual. The result was the increasing applicability of psychology to the field of education.

Modern education and the science of child study are greatly indebted to Galton. He undertook studies of individual differences in imagery and sensory capacity, collected material bearing on the problems of mental heredity, and laid the foundation of biometrics. He introduced the concept of mental tests and developed laws describing the distribution of mental traits. These concepts were transmitted to America through Cattell.

The introduction of psychological tests and their use in the study of school children has been one of the most important factors in the identification of the varying needs of the heterogeneous school population and in the development of suitable educational techniques to meet diverse needs. Before the introduction of psychological measurement there was little effective classification of school pupils, little provision of real value for educational needs, and scarcely any educational guidance worthy of the name. Tests have helped appreciably both to reveal and to solve educational problems.

There was a distinct continuity in the testing movement from the work of Binet to developments in the field of mental measurement in this country. The work of Binet influenced Terman; and Otis working with Terman originated tests, the techniques of which were used as a basis for tests employed extensively during the World War.

Clinical and abnormal psychology have also contributed to psychological service for schools. The study of abnormal adults revealed the fact that many difficulties have their inception in childhood. A method of clinical study, applicable to both adults and children, has been developed for the study of mental deviates. This work has made possible the establishment of the school clinic with trained specialists to carry on its functions.

EDUCATIONAL PROBLEMS FOR WHICH PSYCHOLOGICAL SERVICE IS NEEDED

Not every educational problem is solved automatically by the application of some well-known law of psychology. Many otherwise baffling situations may, however, be reduced to comparatively simple terms by the application of psychological techniques. Problems to which these techniques are applicable include the following:¹

1. The solution of instructional problems arising daily in the classroom, involving individual pupils or groups of pupils.
2. Investigation of the problems presented by exceptional pupils, including the mentally subnormal, the gifted, the specially talented, the physically handicapped, the nervous, and the delinquent.
3. Surveying the talent and achievement of large groups of pupils.

¹ A more complete list is given in the next chapter. The list given here is not classified. It is arranged roughly in the order of chapter headings that follow.

4. The interpretation of the results of such investigations for the improvement of pupil welfare and instruction.
5. Grouping pupils for instructional purposes in ways that are most advantageous for the child and for the school.
6. The investigation and reeducation of pupils deficient in the skills or tool subjects.
7. Assisting pupils in the improvement of study and work habits.
8. Educational and vocational guidance.
9. Educating parents in understanding pupil problems and in coöperating with the school.
10. Constructing a curriculum that is educationally worthwhile and psychologically sound.
11. Undertaking through research and experimentation the study of the laws of child development, the interests and needs of pupils, and their personal characteristics.

PSYCHOLOGICAL SERVICE FOR SPECIFIC PROBLEMS

Many instructional problems arise from the heterogeneous character of the school population in any classroom. This will be true even though the pupils may have been "classified" in duly approved fashion. Although the pupils may be placed in homogeneous groups, individual differences in attention, in rate of learning or achieving a particular skill, in becoming socially adjusted, in forming desirable personal habits, still persist. Psychology comes to the teacher's aid in analyzing the kinds of differences found, in determining the extent of existing differences, and in developing the best procedure to meet individual needs.

Other instructional problems arise in the technique of teaching and in the learning of the skill subjects. When

should reading be begun? How much practice is needed for the mastery of the long-division process? Psychology assists in answering these questions. The amount of progress made by the pupils in the techniques of arithmetic, reading, spelling, and handwriting can scarcely be determined accurately without the use of the standardized achievement test, the product of experimental and applied psychology.

The identification of the school's exceptional children has been mentioned as another function which depends upon psychology for accurate data and scientific technique. The individual differences in any classroom may be slight or extreme. In the latter case the deviating pupils may constitute serious problems that the regular classroom teacher is not equipped to handle. The task becomes one of determining the extent of deviation in the most exceptional pupils, the differential diagnosis of all cases, and the educational readjustment of the pupil and his associates. Most of the unusually exceptional children need an educational program radically different from that found in the average classroom. The methods used in the instruction of normal or gifted children may be unsuitable for the mentally subnormal and potentially feeble-minded pupil. The most efficient method for the instruction of extreme deviates can be determined in large measure from the psychological study of the gifted child, the mentally subnormal child, the nervous child, the speech defective, the physically handicapped.

Often the study of the general status of achievement in large groups of children is the school's most pressing need. To obtain the necessary information, a school survey of pupil capacity and achievement is required. The choice of suitable techniques for the investigation, the organization of the program, the interpretation of the resulting data, are features of psychological service.

Diagnostic and remedial work in the skill subjects is a

popular innovation of progressive education. In undertaking such work successfully it is necessary to discover the pupils in need of such study and treatment and to devise suitable methods of instruction, usually with a dual purpose — the breaking up of wrong habits and the fixing of right ones with respect to the skill to be learned and attendant factors. The vast amount of research in the psychology of the elementary school subjects within the last decade has made possible the direction of diagnostic and remedial work with resultant efficiency and success. In such work several conditions are essential: an understanding of the characteristics of the child to be reeducated, knowledge of the psychology of the skill in which the child is to be instructed, knowledge of the psychology of learning and drill.

Successful educational guidance depends upon adequate study of pupil capacity and achievement and the possibility of prognosticating from present data what the possibilities are for happy adjustment in later school work or in an occupation. There are too many unknown quantities in the human equation for the attainment of perfect success in vocational and educational guidance. The possibilities that do exist in the field are almost entirely the result of efforts of psychologists to study pupil capacity in relation to future success along academic and vocational lines.

Research in the psychology of learning has thrown new light on the reasons for success or failure resulting from pupil study habits. Why can one pupil in fifteen minutes "learn" a lesson, whereas another pupil after two hours achieves no success? Interest, effort, attention, skill, planning, system, conflict, inhibition, distaste, distraction, are all factors which make for or militate against successful outcomes from pupil study. The pupil study problem is relieved through psychological study of the situation.

Child study and its complement, parental education, have

attained significance and value with the development of more accurate methods for the study of mental growth. Modern schools interpret the findings for parents of the children enrolled, with resulting improvement in adjustment on the part of pupils through increased understanding on the part of parents.

Curriculum construction requires the services of psychology in determining the successive adjustments in method and materials that are required to meet the needs of the changing child. New findings in psychological research in education necessitate revision of the curriculum. Should manuscript writing, for example, be taught in place of cursive script? If so, extensive readjustments may be necessary in methods of instruction, time allotment, and initial period for beginning writing. The answer to the question will be found in handwriting research of the next few years, research which involves a study of child activity with respect to handwriting, motor control, perception.

Progressive schools find an increasing number of problems requiring the services of experts in psychological research. Some of the most pressing problems are those associated with the nature of the learning curve for different children in a variety of functions. Others are related to the nature, variety, and duration of pupil interests at different stages of development. Many of these are problems only indirectly related to the instruction of pupils in the classroom. As a result of such research, however, more helpful psychological service can be performed in educational institutions. Continued test construction must be considered both a service and a research function of the school. As a research function it involves the general evaluation of tests to be used, from the standpoint of validity, reliability, and suitability for educational purposes, and sometimes the construction of new testing devices. A new vocabulary test

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may be needed for the kindergarten. In such a case the principles of psychology operate in the determination of the material to be included, the form to be used, the method of application, the time limits to be imposed, the arrangement of material, and the determination of standards.

RESEARCH RESULTS INTERPRETED FOR SCHOOL PRACTICE

Research work of the past twenty-five years has been especially fruitful of conclusions related to problems of child conduct. To contributions of this research the educator is greatly indebted. The results of experimentation do not, however, function automatically in the case of any particular child. It is necessary for the gap between the outcomes of experimentation and the application of such outcomes to the particular individual case to be bridged. The general principles of educability may have been determined by research. But such findings will not function in instruction until the principles are interpreted for the individual case and the problem becomes, for example: How educable with respect to fractions is ten-year-old Jack, who is now in the fifth grade? Psychological service facilitates the interpretation of research findings for school practice.

This brief survey indicates the possibilities of psychological service in education. Obtaining the needed service and utilizing it effectively for public welfare are functions of the progressive educator.

An adequate understanding of the possibilities of psychological service in education can best be appreciated after a survey of psychological functions now being carried on in progressive schools and a résumé of the work of pioneer educational psychologists.

QUESTIONS AND TOPICS FOR FURTHER STUDY

1. Study all the cases of pupils who have failed one or more grades in a public school. How can further failure be prevented?
2. List all the facts the school needs to know about children entering first grade.
3. Would you ever admit to first grade pupils less than six years of age? Under what circumstances?
4. To what extent are data on the following items obtained for pupils in an elementary or high school with which you are acquainted: ages of individual pupils; home background, intelligence; achievement; interests; vocational aptitudes; nervous habits; physical condition?
5. Study the interests of one class of school children in the fourth or fifth grade. What is the extent of interest in school subjects, in games, in social contacts, in making things, in animals? What is the relation of interest to success in the activities undertaken?
6. List the things about your own education that seem to you now to have been more conducive to maladjustment than to adjustment.
7. An educator who described the progress a school system had made in terms of the "number of seats" added for the school system recommended at the same time installing a number of adjustment clinics for the school system. What is inconsistent about the proposal?
8. Should every child be urged to attend high school? State the reasons for your answer.
9. What changes have taken place in education in the past twenty-five years as the result of increased emphasis upon the child as the center of the educational process? Compare early and recent board of education reports; early and recent courses of study.
10. Compare a course of study for 1890 and one for a progressive school of today. What differences do you find?
11. What changes have taken place in child study during twenty-five years? Cite illustrations of changes.
12. Determine the extent to which objective measurement of pupil achievement is used in a school with which you are acquainted, as compared with the extent to which it was used in the same school ten years ago.
13. What are the most pressing problems of a psychological nature that you can think of in connection with a particular school? List any other problems that occur to you in addition to those listed in the chapter.
14. Name several specific instances in which educational research has made an important contribution to the solution of instructional problems.

CHAPTER TWO

PROVISION FOR PSYCHOLOGICAL SERVICE

THE administrators of progressive schools find it impracticable to assign to regular teachers and supervisors all the functions implied in adequate psychological service. In the larger school systems provision for such service is made through the organization of bureaus of research, psychological clinics, or departments of child study with experts in charge. Schools in which the enrollment is too limited to justify departmental organization for extensive service employ individual experts. Such specialists do not supplant the teachers or supervisory and administrative officers but coöperate with them in the interests of pupil welfare.

DISTINCTION BETWEEN THE ACTIVITIES OF THE TEACHER AND THOSE OF THE SPECIALIST TRAINED IN PSYCHOLOGY

The successful performance of the psychologist's functions requires specialized training combined with extensive experience in applying psychological principles in the classroom. Most teachers and educational administrators are not trained in the methods and techniques of child-study experts. The most progressive teachers and administrators appreciate the value of the expert's services and are able to interpret the outcomes from psychological investigation for the improvement of instruction, but they are not usually prepared to handle the technical aspects of child study. The teacher is as highly specialized in the technique of teaching as is the psychologist in child-study functions. Consequently the argument that the establishment of research bureaus and the employment of specialists for the study of pupil problems may tend to deprive the teachers and school officers of responsibilities that they should regularly assume cannot be supported. The psychologist's functions are enormously

time-consuming and must frequently be carried on simultaneously with pupil instruction. It is usually cumbersome and inefficient to take teachers and officers from their regular duties to carry on the functions of specialists.

Experts have long been employed for the solution of problems involving school architecture, heating, ventilation, the selection of textbooks and school equipment, and physical hygiene. In many schools attention to the physical beauty of school buildings takes precedence over the scientific study of pupil problems; in the modern school a reversal of emphasis is found to be profitable from the standpoint of pupil welfare. The employment of experts for psychological service is evidence of progressive practice in education.

ADVANTAGES IN PSYCHOLOGICAL SERVICE ORGANIZED WITHIN THE SCHOOL SYSTEM

Public and private agencies of all descriptions have been instrumental in recent years in establishing child-study clinics and fostering parental education for child training. For the following reasons the public schools are logical agencies for the establishment of child-study departments under their own jurisdiction: (1) The child is at home in the school situation, and his normal reactions can usually be observed there. (2) When the work is conducted by the school, close contact can be established between the child who is the subject of study and the teachers and parents who carry on the educational program. (3) Child-study experts in the school system understand educational problems and are able to interpret the child's problem from a pedagogical and a normative rather than pathological point of view. (4) Parents usually feel no hesitation in bringing the child's problem to the attention of the school authorities. (5) Practically every problem of child adjustment involves the child's formal school training in some way. (6) Habit training can be

directly related to school procedure. Pupil adjustment is then regarded as one of the school's functions. (7) Usually less expenditure in time and money is necessary for the parent and the school when child-study activities are conducted as functions of the educational system rather than as the result of private enterprise.

DEPARTMENTAL ORGANIZATION FOR PSYCHOLOGICAL SERVICE

In the larger school system, enrolling thousands of children, the most satisfactory solution to the problem of providing adequate psychological service is found in the establishment of a research bureau or department of child study and guidance. The actual titles of such bureaus vary as widely as do the bureaus themselves. A common purpose, however, underlies the activities of the majority of those now established. In virtually all of them activities connected with pupil welfare and adjustment problems — exclusive of regular teaching, supervisory and administrative functions, and activities relating primarily to the physical welfare of the pupils — are commonly brought together under one central department directed by one person or by a supervisory committee. Such departments are almost universally manned by specialists in psychological technique.

Similar bureaus are maintained by the leading state universities and by a number of state departments of education. The services of such bureaus are especially useful to the smaller community unable to support an independent bureau of its own. The services of most of the bureaus in state universities and state departments of education are available to the communities of the respective states in which they are located. In a few communities county or district organizations have been effected with satisfactory results.

Descriptions of research bureaus and similar organizations are to be found in educational literature. The most

complete descriptions of city school, state, and university bureaus are contained in the reports of Chapman (6), Martens (21), and Deffenbaugh (10). Other detailed reports of the functions and administration of research and child-guidance activities in bureaus organized in city school systems are given by Davis (9), who describes the work of the research department in Jackson, Michigan, and includes a discussion of activities of such bureaus in general; Baker (325), who describes the work of the child-study bureau in Detroit; the Department of Psychology and Research of Los Angeles (12); and Wallin who gives descriptions (35, 38) of the work in St. Louis.

The studies of Chapman, Martens, and Deffenbaugh include summaries of functions, personnel, and organization of research bureaus connected with educational institutions throughout the country and more complete descriptions of representative research bureaus and child-study organizations. Chapman summarizes his findings for research bureaus in city school systems as follows: "The typical bureau of research in city school systems was established in 1920; it has a staff of four persons, a director, an assistant, a general clerical helper, and a psychologist if the director is not a psychologist himself."

In a large organization the director of research is an assistant superintendent who administers the work, and the school psychologists are assistants directly responsible to the director for the performance of their duties. In smaller organizations the director is a psychologist who does a large share of the work himself, assisted by one or more mental examiners, social workers, or clerical assistants. Usually the director of the research department is immediately responsible to the superintendent of schools. Occasionally he is responsible to an assistant superintendent or to a supervising principal.

EDUCATIONAL AND PSYCHOLOGICAL CLINICS

Research bureaus as organized in many city school systems, state departments of education, and universities include some phases of child-study activity among their numerous functions. Most of the research bureaus carry on some activities only remotely related to child welfare and adjustment. For the more highly specialized functions of pupil diagnosis, adjustment, and guidance many schools and university centers have provided educational or psychological clinics. In some cases the clinic is organized as a subordinate department of a larger child guidance or research bureau.

The purpose of school clinic organization is to assemble coördinate, and dispense information concerning individual pupils and to provide diagnostic and guidance service for deviates and problem pupils. The psychological clinic usually specializes in the observation, diagnosis, and adjustment of defective or maladjusted pupils, whereas the educational clinic as organized in several school systems deal chiefly with specific difficulties of individual pupils in school subject achievement. If a study of the child's deficiency reveals a larger adjustment problem, more intensive study of the whole case is undertaken.

Educational or psychological clinics have been operated successfully in the school systems of Baltimore, Cleveland, Detroit, Los Angeles, Louisville, New York, and Rochester and at the University of Pennsylvania, the Johns Hopkins University, Harvard University, the University of Iowa, and Northwestern University. In a number of the smaller progressive school systems activities similar to those of clinics in the larger ones are conducted without the organization of a clinic as such. The personnel and methods of educational and psychological clinics are described in a later chapter. Descriptions of the work of several school clinics are listed in the Bibliography at the back of the book.

THE SCHOOL PSYCHOLOGIST

In many progressive public school systems and private schools the educational specialists employed are known as school psychologists. Such specialists are regular members of the staff not wholly identified with the teachers, principals, or supervisors. In coöperation with others they carry on general functions of child study and adjustment; and they employ scientific techniques, so far as these are available, in obtaining information of an objective sort about children, using such information in coöperation with teachers and supervisors for purposes of educational guidance. They undertake the diagnosis of pupil maladjustments by all available means, and their offices serve as clearing bureaus for teachers, administrators, and laymen seeking assistance in the study of pupil problems.

The relation of the school psychologist to the larger research bureau depends somewhat upon the situation in the particular school system. The school psychologist may be either the director or an assistant in such an organization. In the smaller school the school psychologist usually functions without departmental organization.

The problems confronting the school psychologist make demands upon him which necessitate specialized training and the possession of distinctive qualifications for successful work. School children present highly individualistic and often abstruse problems of behavior. Many of these are closely related to habit formation such as is required in the learning of the "school subjects." Experts who give attention to such problems require a working knowledge of the psychology of the school subjects as well as a thorough grounding in the science and theory of education. The principles of the psychology of drill and motivation are a fundamental part of their equipment.

Training centers for school psychologists are found in the

larger universities. In the Annual Bulletin of Teachers College, Columbia University, a list of courses has been given, with slight modification, each year since 1920 as suitable for the training of school psychologists. The list as given in the 1928-1929 Bulletin includes courses in the following: teaching in special classes, field work with special classes, administration of special classes, psychology of exceptional children, mental adjustments, vocational tests, statistical methods, mental and educational tests, measurement in elementary education, mental testing of the young child, clinical work with young children, measurement in kindergarten and first grade, measurement in secondary education, tests and measurements in music education, tests and measurements in physical education, methods of research, clinical psychology, diagnosis and remedial treatment in elementary subjects, research in intelligence testing.

Such courses provide the psychologist with a technical background for child-study functions. Courses in the theory and history of education, administration and methods in general, and educational psychology provide the necessary background in education and psychology.

The results of a questionnaire used by the writer to obtain information about the status, experience, and training of school psychologists revealed the fact that psychologists in the larger school systems almost invariably hold the M.A. or Ph.D. degree, chiefly in education. A majority of the psychologists replying to the questionnaire reported more than five years' experience as psychologists and more than three years' experience as teachers. Twelve private schools reported fifteen psychologists on their staffs. The amount of university training, reported for eleven psychologists, was five years or over in all but one case. Degrees were reported in thirteen cases. Seven of the psychologists had the Ph. D. degree, and six the M.A. degree. The amount of teaching

experience reported by seven psychologists varied from one to twenty-two years. In seven cases length of experience as a psychologist varied from two to ten years. Judging from the amount of training and experience reported, the data indicate that in the large majority of cases psychologists at present actively engaged in their work are well prepared.

In the American Psychological Association Yearbook for 1929 there are listed eighty-seven psychologists who are employed by schools or who work chiefly with school children. School psychologists are active in a number of foreign cities. The principal centers for training and practice are Hamburg and London.

FUNCTIONS OF RESEARCH BUREAUS, PSYCHOLOGICAL CLINICS, AND SPECIALISTS IN PSYCHOLOGICAL SERVICE

Reports of the actual and theoretical functions of child-guidance specialists and research bureaus in educational institutions are available from a number of different sources. Statements, in part theoretical and in part descriptive of actual practice in schools, have been made by Wallin (180), Goddard (15), Pyle (381), Walter (39), Paynter (25), Hutt (17), and other psychologists. A tabulation of the functions of specialists now at work in the schools of the country was made by the writer from data obtained by the questionnaire method. From these two sources the following list of functions of specialists in psychological service is derived:

A. Measurement and statistics

1. The selection and administration of standardized intelligence and achievement tests. (This function is usually shared with teachers and administrators.)
2. The administration of school surveys of the mental capacity and achievement of pupils.

3. The use of rating scales and questionnaires for obtaining additional information about the mental traits of pupils.
4. The construction of tests and rating scales for both service and research functions.
5. Teacher training in use of psychological techniques.
6. The use of suitable statistical procedures in studying and reporting psychological data.

B. Study and guidance of individual pupils

7. The identification of exceptional pupils — the mentally subnormal and the gifted, the unstable and the handicapped.
8. The educational guidance and reëducation of exceptional children, including in some cases the organization and supervision of special classes and the assignment of pupils to special classes.
9. The study of exceptional children through interview and observation.
10. Differential diagnosis of the difficulties presented by problem pupils. This may include the organization and direction of clinical case study.
11. The diagnosis of pupils deficient in the skill subjects of the school curriculum; studies of pupils deficient in reading, spelling, or the techniques of arithmetic or handwriting, and of pupils with language handicaps and the like.
12. Educational counsel and guidance for individual pupils.
13. Vocational counseling for individual pupils.

C. Assistance in administration and supervision

14. The classification and grade placement of pupils. This function usually involves recommendations to principals or educational directors rather than re-

sponsibility for the actual placement of pupils in certain grades or the actual sectioning of groups of pupils.

15. Improvement of the marking system.
16. The organization of a record-keeping system for the department of research or the psychologist's office; the construction of record cards for the preservation of pupil records of mental development and achievement; coöperation with administrators in devising record systems for the school.
17. Reporting in most suitable form to school administrators, the board of education, patrons of the school, and the general public the findings resulting from psychological service; and carrying on publicity work where it is needed for expansion of the activities described.
18. Organizing psychological service in the larger schools so as to provide for the entire educational system a clearing bureau to which may be brought problems connected with the foregoing functions.
19. Maintaining files of test materials, instructional materials, and professional literature for the general use of the school staff.

D. Assistance in instruction

20. The interpretation of the results of measurement for improvement of instruction and pupil adjustment.
21. Remedial work in connection with deficiencies in the skill or tool subjects.
22. Diagnostic and remedial work with speech defectives.
23. Assistance to teachers in problems of instruction, including the choice of suitable drill materials for specific purposes, the use of check tests in skill subjects, and the use of graphic devices for indicating

pupil progress, the improvement of teacher checking, and observation of pupil achievement.

24. The investigation and improvement of pupil study and work habits.
25. Curriculum construction, with particular reference to age and grade placement of instructional materials and provision for individual differences in achievement.

E. Research

26. Conducting research bearing directly or indirectly on school problems. This research is undertaken for the solution of some pressing problem brought by a teacher, or it is directed toward the solution of a problem affecting teachers generally.

F. Auxiliary functions

27. Education of parents with reference to educational problems affecting child welfare. The organization and direction of parent study groups.
28. The establishment of contacts between the home and the school. This function may be performed in conjunction with or independently of the function of parent education.
29. The establishment of contacts with private and state educational agencies and the social agencies of the community.

FUNCTIONS OF RESEARCH BUREAUS

One of the purposes of the study of research bureaus by Martens (21) previously referred to was the investigation of the functions actually performed by such bureaus. The results indicated that a heterogeneous lot of functions was performed, varying widely from bureau to bureau. The term "research" appeared for the most part to be a misnomer. Research of a technical sort was far down on the list of func-

tions performed. The term "research bureau," although not actually the title of all the bureaus surveyed, was used by Martens to include organizations having similar functions. A tabulation of the functions of these bureaus shows a long list of functions, with intelligence and achievement testing highest in frequency. Next in order is the administration of surveys and statistical inquiries. Classification of school children is the function third in order; supervision of special classes, fourth; and educational guidance, fifth.

The first five of the functions mentioned, all of which are included in the work of more than half the bureaus, pertain for the most part to the problems of pupil adjustment. Activities related to the more mechanical aspects of school administration and to educational research proper take second place. In summarizing these functions, Martens says: "We conclude that the average bureau of research in the city school system finds it necessary to forego the more theoretical and technical aspects of educational research for the sake of being a bureau of service in practical application of research principles to the school it serves."

Chapman (6) reports the functions of the research bureaus included in his investigation as follows: "In the list of functions the director of the median research bureau checked the following items: achievement testing, school finance other than budgeting, curriculum revision, experimental study of curricular and instructional problems, educational guidance, mental testing, psychological clinic, supervision of special classes, training teachers for special testing work, surveys and special investigations, classification of pupils, devising record and report forms, experimental study of special problems relating to administration."¹

¹ From Chapman's *Organized Research in Education*, page 211. Quoted by permission of Ohio University Press, publishers.

VARIATIONS IN PROVISION FOR SERVICE

In no one school system does the research bureau or psychologist perform all the functions mentioned. Many more of the functions are performed in some systems than in others. In the most progressive schools methods of providing for the most important of these functions are carefully considered. In not all cases is the performance of each of them solely or even in part the work of specialists. Some are performed successfully by teachers, by principals, by attendance officers, by school physicians or school nurses, by committees of parents and teachers, by assistant and student teachers, and by outside assistance from private clinics and welfare agencies.

The organization best suited to one school system will not necessarily fit another. Individual adjustments must be made in view of prevailing conditions. The needs will vary with the size of the community, the percentage of the children enrolled, the economic status of the community, the level of educational attainment reached by the parents, the number and kinds of welfare agencies already at work in the community, the attitude of leading citizens toward psychological service, the general progressiveness of the school system, and the training and experience of its staff.

In the truly progressive school every function mentioned in the foregoing list is included in some way in the school program.

PIONEER PSYCHOLOGISTS IN EDUCATION

A number of psychologists have made noteworthy contributions to education through the application of psychological principles to the study of educational problems and through the improvement of psychological technique for studying pupil behavior. The work of these pioneers both in America

and abroad has served as the foundation for the achievements of the younger generation of school psychologists. In the following paragraphs is reported the work of only those psychologists whose activities have been most closely allied to service functions in education. The experimentation of many other psychologists and educators, among them Meumann, Ebbinghaus, James, Hall, Dewey, Thorndike, Judd, Spearman, Thomson, and Claparède, has made the work of school psychologists possible.

Pioneers in Europe. Alfred Binet was one of the first specialists to apply psychology to the problems of the school-room. He assisted the schools of Paris in the classification and training of school children, using objective methods which he himself originated in attacking the educational problems assigned to him. About the year 1903 a society was organized in Paris for the purpose of studying the mental adjustment of school pupils. Of this society Binet was the leader. In 1904 a commission was appointed by the Minister of Public Instruction to investigate the instruction of sub-normal children who were obviously unable to profit from instruction in regular classes. A special school was organized for these pupils, and admission to the school was based on medical and psychological examinations. The contribution of Binet and his associate, Simon, was the construction of a scale for determining the mental levels of the pupils. In 1905 Binet established in a primary school in Paris a laboratory of experimental pedagogy in order to apply to instruction the results of the most recent research.

Binet believed that nothing was so deceptive as judgments of intelligence based on physical characteristics. He quickly perceived the large amount of error present when teachers and others attempted to estimate the intelligence of pupils. It was of little assistance to the psychologist for teachers to say with respect to children, "He looks dull," or, "He looks

bright." The teachers lacked standards of conduct to which to refer their observations. Furthermore, their observations were subject to error that was due to personal bias. Of three methods of exploring intelligence — medical, pedagogical, and psychological — only the last could be considered valid, in the opinion of Binet and Simon.

Binet suggested educational definitions of idiots, imbeciles, and morons. He also advocated the classification of school children on the basis of aptitudes — literary, scientific, and those related to success in shop work. He saw clearly the need of training each child to a career suitable to his special aptitudes. In fact, after twenty years of work in the schools Binet concluded that the determination of children's aptitudes was a matter of great importance in education. He believed that teachers should be acquainted with differences in the mentality of school children and should have a thorough knowledge of the psychology of the individual.

Binet was also a pioneer in developing the concept of educational tests and in constructing and standardizing age-level scales for testing deficiencies of individuals in reading, arithmetic, and spelling. His death cut short his plan to extend this work to include tests of history and geography. Binet stressed the importance of suiting the educational program of the school to the individual needs of the pupils.

Decroly, a pioneer in the administration of the Binet tests to school children of Belgium, has conducted many investigations of defective children, including the feeble-minded, the deaf, and speech defectives. His methods for the study and instruction of normal and superior children, as well as of defectives, are ingenious and progressive. Among his inventions is an extensive system of educational games for the more efficient instruction of children in the skill subjects. These materials and methods have been disseminated from Dr.

Decroly's institute in Brussels and are used by his students in many schools of Europe.

The German psychologist Stern was one of the earliest writers to employ the term "school psychologist." He became particularly interested in the subject of individual differences and after the appearance of the Binet tests he was quick to recognize their value in connection with the work of the schools. He made further application and study of the scales and originated the concept of the intelligence quotient. Stern also showed that when a sufficiently large number of nonselected children of different ages are tested their degrees of intelligence will be distributed in a somewhat symmetrical fashion. Stern has made extensive investigations of gifted school children and devotes a large share of his attention to the actual psychological and instructional problems of the schoolroom.

Among the foremost English psychologists who have given extensive service to schools are Burt and Winch. Burt's (49) activities as a psychologist in the field of practical school problems are indicated in his book, *Mental and Scholastic Tests*, a publication which contains the germ of later developments in psychological measurement and their application to school problems. Test construction, the study of problems of classification, the detection and study of deviates, diagnostic work with individual pupils in reading, spelling, arithmetic, drawing, and writing have all been advanced by his investigations. Winch has prepared test materials and undertaken extensive research in connection with classroom problems.

Pioneers in America. Witmer, as the result of demands from teachers for help with pupil problems, established at the University of Pennsylvania in 1896 the first psychological clinic in America of which there is a record. It was he who first suggested applying the term "clinical psychology" to a method of scientific child study. Witmer's pioneer efforts

are reflected in the modern school clinic. To his clinic came children from the schools and institutions of the city and of the surrounding territory. Through observation and practice in the clinic specialists were trained to carry on the work in other centers. Witmer contributed an article (188) to the first volume of the *Psychological Clinic*, published in 1907, on the subject of clinical psychology. In this article he described methods of studying problem children and the activities and personnel of the psychological clinic.

Huey was also interested in clinical psychology at an early date and in 1908 discussed the desirability of applying the clinical method to psychological problems. His contributions to psychological research and technique include an early revision of the Binet tests and a scientific study of subnormal and feeble-minded children. His pioneer work in the study of the reading process, culminating in the *Psychology and Pedagogy of Reading*, furnished the basis for modern practice in the teaching of reading.

Goddard has carried on extensive work with tests in connection with the study and training of subnormal children in institutions. He was the first psychologist to make widespread use of the tests with school children in the United States. In fact, it was he who first applied tests to all the children of a school system and disclosed the need for differentiated treatment of pupils. Through his use of the Binet-Simon scale with American children tremendous importance came to be attached to the problems of backwardness and feeble-mindedness in the public schools. Goddard coined the term "moron" and was one of the first American psychologists to apply scientific techniques to the study of feeble-minded children. He directed work in clinical psychology at Vineland as early as 1910 and with Witmer ranks as one of the early leaders in the training of psychological specialists in educational work.

Terman has influenced general education chiefly through his construction and application of revisions of the Binet scale and the interpretation of the results in the interests of pupil welfare. Through the application of the Stanford Revision of the Binet tests the varying degrees of backwardness and subnormality have been more sharply defined and differentiated. Terman's work indicating the presence of as many gifted as subnormal children in the public schools disclosed an educational problem of the first magnitude. He suggested that the gifted, since their contribution to society might be expected to be greater than that of any other group, should have fully as much attention as the backward and subnormal child. Terman's publication, *The Intelligence of School Children*, classes the author with the group of psychologists who have aided the solution of the most urgent school problems. Among the problems which he has investigated are the classifying and sectioning of school children, the educational treatment of the bright and dull, and educational guidance and counseling. In all this work he has stressed the importance of utilizing test methods. His activities have also included the construction of scales for rating the personality traits of school children. He and his associates have made a special study of gifted children.

Wallin, another pioneer psychologist, has established clinics for the study of school children and was himself one of the first psychologists to be employed by a city school system. He has not only performed this practical service but has added to our knowledge of the mental adjustments of the school child, of the facts about subnormal and handicapped children generally, and of the general principles of educational treatment for such children through extensive research.

The activities of these leaders has served as an impetus to the further extension of psychological work in the schools. Their most noteworthy contributions have been made in

the study of gifted children, the educational treatment of the subnormal, the construction of devices for mental measurement, and the study of maladjustment in children.

INTEREST OF OTHER PROFESSIONAL GROUPS IN CHILD STUDY

Other professional groups have shown increasing interest in child study and child adjustment problems. Psychiatrists have extended the concept of mental hygiene to include the diagnosis and treatment of abnormal children as well as of adults, with special emphasis on preventive work in childhood. Sociologists have indicated the importance of environmental factors in cases of maladjustment and have developed techniques for studying the child in his social setting. Clergymen have broadened their concept of moral training to include physical, psychological, environmental, and educational factors affecting behavior. Contributions of each of these professional groups, directed toward more complete understanding of the child and coördinated with the efforts of psychologists and educators, will insure progress in child welfare.

QUESTIONS AND TOPICS FOR FURTHER STUDY

1. What are the resources of your community for psychological service? the resources of the state department of education? Are services of university bureaus available to the community?
2. Are there any advantages in having a bureau outside the school system and some distance away conduct measurement and child study work within the school system? What are the disadvantages in calling in such outside assistance?
3. What personal qualifications are desirable in a school psychologist? Outline a suitable course of training for school psychologists. How will this training differ for psychologists working at different school levels—elementary school, high school, college?
4. What part should each of the following specialists be expected to play in child study: teacher, principal, psychologist, psychiatrist, visiting teacher, social worker, neurologist, medical examiner, nutrition expert or dietitian, school nurse? What should be done to insure integration of the findings of these different specialists?

5. In Moscow the medical examination, the psychological study, and the anthropological study of the child are all conducted in one laboratory. What are the advantages in this arrangement? Would you recommend it for most American schools? How would you organize these three types of service so that there would be coördination without duplication of service?

6. Obtain from several teachers their statements as to the kind of service they need most for their problems; the facts they would like to have for each child.

7. Outline the organization of a child-study department for a public school system in a city of 100,000 population.

8. Evaluate the work of a school system in a city of 25,000 or more with reference to child study and educational guidance. Check what is done against the list of psychological service functions given in the chapter.

9. Does your state department of education provide facilities for child study and guidance for smaller communities? Compare the service with that provided in other states.

10. What sort of training should be given prospective teachers in teacher-training institutions so that they will be prepared to utilize the services of school psychologists? To what extent should they be prepared to perform psychological service functions?

CHAPTER THREE

PRINCIPLES OF PSYCHOLOGICAL MEASUREMENT

FOR both service and research functions in education psychological measurement is indispensable. The test movement has consequently become an integral part of modern educational practice, and progress in educational method is closely associated with it. The advantages to be derived from the use of measurement, both from the standpoint of pupil welfare and actual economy to the school system, are recognized. Familiarity with the principles of measurement and the characteristics of tests—their uses, advantages, and limitations—is a necessary part of the educational expert's equipment.

THE VALUE OF STANDARDIZED MEASUREMENTS

Measurements are of value to the educator for several reasons:

1. Measurements help to refine and control observations of behavior.
2. Subjective judgments are highly unreliable and often inadequate.
3. The use of measurements enables the observer to arrive at facts more quickly than would be possible otherwise.
4. Measurements make prediction more reliable.
5. Through measurement it is possible to set up goals and measure attainment.
6. Standardized measurement of school subject achievement is of increasing importance as subject matter boundaries are discarded and "centers of interest" or "units of work" are introduced.
7. Measurements make school-parent conferences more objective and less personal.

THE UNRELIABILITY OF ORDINARY OBSERVATION

Measurement of pupil progress is important because of the general unreliability of parents' and teachers' judgments. Terman considers the average teacher's opinion of a pupil's intelligence as actually less reliable than the class record of a child's age-grade status. In his study of gifted children he found that choosing the two or three youngest pupils in any class yielded a larger proportion of gifted children, judging from later test results, than were found by asking the teacher's opinion. The opinions of parents and laymen are subject to the same errors observed by Binet in teachers: Standards of comparison may be lacking, and prejudice may be shown for or against the individual being judged. It is not impossible for a parent to make a fair estimate of a child's capacity and achievement, provided he can assume an objective point of view. Careful observation will assist in making judgments more reliable, but on the whole the statement that "General impressions are never to be trusted" holds true. For situations in which it is impossible to use measurements the attitude of measurement is valuable, since the attitude of measurement makes for greater rigidity of observation and the exercise of greater caution in the interpretation of data.

Studies by Wallin,¹ Pintner,² and others have been reported of the value of judgments of intelligence from photographs. The results of these studies indicate an almost complete lack of reliability in judging mental traits from photographs. Judgments of the intelligence of children from physical appearance alone are highly unreliable, a fact early recognized by Binet and other investigators.

¹ J. E. W. Wallin, *Clinical and Abnormal Psychology*, page 557. Houghton Mifflin Company, Boston, 1927.

² Rudolf Pintner, "Intelligence as Estimated from Photographs," in *Psychological Review*, Vol. XXV, pages 286-296; 1918.

MEASUREMENTS REVEAL FACTS QUICKLY

Measurements reveal significant facts about school children more promptly and with greater accuracy than does uncontrolled observation. Measurements have removed much of the guesswork that formerly permeated child study. A semester's time is frequently too short a period for the teacher, unaided by objective measurement, to form a true opinion of the child's ability to read, or to estimate his general educability. Two hours' time spent in the administration of standardized tests may be sufficient for ascertaining the salient facts with a high degree of reliability.

Consider the situation of one teacher who at the opening of school was confronted with a group of forty children about whom she had little information. The class was supposed to do fourth-grade work. There had been no previous classification of the children by means of mental tests. Since entering the first grade, the pupils had been promoted by chronological age, provided they had done passable work. About one third of the children had failed at least one semester of work. All the information the teacher had at hand about the children was the list of class marks for the preceding year. The course of study for the fourth grade was described in minute detail. The teacher was expected to follow it closely and to cover within a given time as much ground as possible in a large variety of subjects. In this illustrative class the mental ability in terms of IQ ranged from 79 to 115, the normal or average IQ being 100; the chronological ages, from eight to twelve; the educational status, as determined by achievement tests, ranged from second grade to sixth; and the amount of interest shown varied from a negative quantity to a highly positive amount. Some of the pupils were well adjusted socially, whereas others showed extremely abnormal characteristics. Some, otherwise nor-

mal, exhibited disabilities in special phases of school work. The situation in the case of several of the children was complicated by sensory disabilities, speech defects, and physical limitations.

Every experienced teacher and administrator knows the difficulties encountered almost from the outset in such a situation. But lack of exact knowledge makes it impossible for the teacher and administrator to anticipate difficulties that arise or to cope with them adequately when they are encountered. The possession of all the basal facts, first by administrators so that proper classification could have been made, and then by the teacher so that the work could have been adjusted to fit the needs of the pupils at the very beginning of the school term, would have resulted, in the illustration just cited, in an enormous saving of time and energy. The teacher who refuses to consult available test results because of fear of becoming prejudiced has not received proper instruction in the use of measurements. The choice of alternatives lies between facing problems at the outset or remaining unaware of them until too late.

In educational institutions one of the goals is always to bring about growth in achievement in certain fields of study and in habit formation. Measurements enable us to know what is to be expected of pupils and the extent to which pupils are reaching the goals prescribed. The goals will not be the same for all pupils but will be determined by the capacity of the individual child. The training necessary to produce the desired amount of growth on the part of each child will vary with circumstances.

MEASUREMENT AN AID IN PREDICTION

The use of tests for prognosis or prediction is assuming increasing importance with the refinement of testing techniques. It is already possible by means of tests to forecast

with considerable accuracy the future status of a child. Prediction with a high degree of accuracy is possible in the physical sciences because the material from which data are derived can be controlled and measured. The predictability of human behavior is of course much less exact. Inaccuracies are due to the difficulty involved in controlling, in such a way that cause-and-effect relationships can be studied and established, all the factors that influence behavior. Difficulty is also due to a lack of precise measures of behavior.

In the educational field some of the facts it is desirable to predict are the following: a particular child's probable rate of learning in the acquisition of the mechanics of arithmetic, spelling, or reading; the changes that might take place in the rate of learning when certain conditions are supplied; a child's probable rate of mental growth; a pupil's probable ability to succeed in high school work; and a student's probable ability to do work in college.

In order to insure accuracy of prediction, methods of measuring intelligence and achievement must increase in reliability and validity. When the reliability of a test is known, we can, within the limits of the reliability of the test, make predictions as to the outcome to be expected upon repetition of the test after an interval of time. General intelligence appears to be one of the central factors in a child's ability to progress in school work. To the extent to which measures of intelligence are indicative of ability to make fast or slow progress in the mastery of the subject matter of the elementary school, and to the extent of the reliability of the tests used to measure intelligence, it is possible to predict from them a child's probable rate of progress and his eventual status at a certain age. It is true that the accuracy of such predictions is at present limited in many ways. We can say, in our present state of knowledge, that the child who makes little progress in learning at the age of six will probably

show marked retardation in the teens, and on the other hand, that the child extremely gifted at four or five is far more likely to be gifted at twelve or eighteen than he is to be of mediocre intelligence or attainment. We cannot, however, predict with certainty whether the fifth in rank from the top of a group, measured in intelligence or achievement, will have precisely this same rank at a later age.

The construction or improvement of prognostic tests for use in the elementary and higher schools offers unlimited possibilities for the experimenter.

MEASUREMENTS HELPFUL IN INFORMAL SCHEMES OF EDUCATION

In experimental schools there is an increasing tendency to discard the formal boundaries of subject matter and to substitute activity programs. Except for brief drill periods, reading, arithmetic, spelling, composition, geography, and literature may all enter into an activity in which a child is engaged and be used by the child without formal recitation or constant attention on the teacher's part to the child's progress. Consequently, objective measurement of the child's achievement in the individual skills becomes a necessity if the administrators of schools wish to know what the pupil is accomplishing in the tool subjects. Formerly the daily spelling lesson revealed immediately the status of achievement of each pupil in spelling a group of assigned words. In modern schools in which much of the spelling instruction is informal and incidental it is necessary at frequent intervals to check the progress made. Even though number work in Grades Two and Three may be learned only incidentally, it is important to check with some regularity the number facts pupils have acquired. The same statement applies to learning in all fields of knowledge and skill.

In experimental schools not organized in terms of a sub-

ject-matter curriculum there is need for more than measurement in skill subjects. The measurement program should include checks on outcomes from projects, group activities, or units of content material in terms of new habits and interests, new concepts or meanings acquired, in so far as it is possible to measure them.

There can be no doubt that the use of tests increases objectivity in pupil placement and as a consequence greatly reduces difficulties with parents over pupil placement. Test results can very quickly settle an argument as to the proper placement of pupils, if they are adequately interpreted and intelligently used by school administrators. The parent who insists that the child has made no improvement in reading or arithmetic during the course of the year's work may be shown the true state of affairs as revealed by achievement test results. The parent is usually satisfied with such objective evidence as tests afford.

STANDARDIZED TESTS AND INFORMAL CLASSROOM EXAMINATIONS CONTRASTED

Psychological tests in their present stage of development are comparatively new. They differ in several respects from older forms of examinations, of which informal classroom tests are illustrative. The chief differences between the older and the newer forms of examination are in the fields of objectivity and standardization.

Observations that are wholly objective may be said to be uninfluenced by the judgment or opinions of the observer. Objectivity in observation is increased with the use of instruments that tend to eliminate the personal equation. Complete objectivity in the measurement of mental traits, though desirable, is not usually attainable.

The older forms of school examinations, particularly those of the essay type, are usually more largely subjective than

objective. That is, the score that the pupil receives on his paper tends to vary with the standards and opinions of the person who does the scoring. Many investigations have been carried on which provide ample evidence for this statement. Among the investigations are those reported by Monroe (95, 96), Orleans and Sealy (99), and Ruch (107). The newer forms of psychological measurement are constructed in such a way as to allow little room for the subjective judgment of the scorer to operate. Answers are indicated by pupils in the briefest fashion, preferably with a minimum of handwriting, and the papers are scored by comparing the answers indicated with the answers provided in a scoring key. Except for carelessness in arithmetic, or misunderstanding of the directions for scoring, independent scorings of the same paper by two persons are virtually identical.

The second term which differentiates the older and newer forms of tests is the word "standardized." A test may be said to be standardized both with respect to procedure and results. Standardization of procedure implies that the form of the test, the conditions of administering, the time limits imposed, the directions given the examinee, are kept constant whenever the test is used. If the pupils are given more assistance during a test than the directions allow, if longer than the prescribed amount of working time is given, if directions for scoring the test are disregarded, the conditions implied in standardization have been violated and pupils' scores cannot be compared with or interpreted by means of the standards provided. The term "standardized," as applied to tests, usually implies that the tests have been standardized with respect to results as well as to procedure. This is accomplished by giving the test to large numbers of presumably unselected individuals of different age or grade groups and computing central tendencies of scores or other statistical measures by which an individual score may be

interpreted. It is then possible to compare an individual score with the derived norms or standards and to evaluate it in terms of them.

Informal school examinations are seldom given to pupils in more than a single classroom and seldom used a second time. This local and temporary use of a test represents the extreme opposite from standardization. By the use of standardized tests it is possible to compare a pupil with a large selection of other children of his age or grade and of other ages and grades in other schools and communities. Standardized tests have the characteristic of universality, as ordinary classroom tests do not. They provide a "universal currency," in the terminology of Burt, for evaluating pupil intelligence and achievement. This feature constitutes one of the chief advantages of standardized tests.

The most important characteristic of a test is its validity. For a test to be valid it should be representative of the field that it measures. The customary type of school test, composed of eight or ten general questions, is representative of the subject matter to only a slight degree. Therefore a student's showing on the test may depend in large part on the chance of the questions' covering those parts of the subject that he knows. The objective test, calling for a minimum of written expression on the part of the pupil and being composed of very specific items, usually covers much more of the subject matter within an equal amount of testing time. The pupil's achievement status is then likely to depend much less on chance than when determined by a subjective test.

The validity of an intelligence test depends, similarly, on the number of mental functions tested and the number, types, and range of difficulty of questions on each function. The degree of reliability achieved by group intelligence tests is the result in part of the number and types of questions used.

The reliability of the newer tests — that is, the extent to which there is agreement of two measures of the same individual by the same test — is greater in the more carefully prepared tests than in the older types of examinations. A large share of the increased reliability is due to increased objectivity, careful selection of items, and statistical analysis of data concerning the questions. The newer types of examinations may not in all cases, however, be more reliable than the more informal classroom examinations. The earlier standardized tests, which were used chiefly for surveys, were rather short, since they were needed only for average measurement of groups. The degree of reliability required of a test depends on its use. If it is employed for measurement of individual status (whether ability or achievement), a much more accurate test is needed than one which is employed to differentiate only between groups.

For a test to be reliable it must make an adequate differentiation between levels of achievement or ability. The extent to which a test can make such differentiation can be determined more easily from a study of the test norms than from a statistical study of the scores on two forms of the test, which procedure is the one most generally used.

Because of its content and organization the traditional school examination can hardly be used for anything else than a basis for assigning school marks. The objective test can be used for various instructional, supervisory, and administrative purposes that involve improvement in the work of the classroom, in the curriculum, in supervision, organization, or administration. The use of tests for these varied purposes is discussed on pages 53-57.

Informal classroom examinations have almost invariably been designed for measuring school products. Seldom have they been constructed to measure intelligence, general ability to reason, and other mental functions directly. Formerly,

when the need for appraisal of such traits was felt, the teacher's judgment sufficed. The scope of standardized tests is broader than that of the classroom examination. Tests purporting to measure every conceivable type of mental response, from "ability to solve a maze" to "emotional" and "moral" behavior, are now available.

CLASSIFICATION OF TESTS AND ILLUSTRATIONS OF THE VARIOUS TYPES

Tests may be classified on the basis of (1) the uses made of them in school situations; (2) the purposes they are meant to serve, or what they are meant to measure; (3) the form, content, structure, or organization⁶ of the material included; (4) the method of standardization and kinds of norms published by the authors of the test; (5) the number of individuals to be given the test at a time.

The classification of tests from the standpoint of the uses to which they are put in schools includes administration, supervision, guidance, pupil analysis, and research. A detailed list of such uses is given on page 55.

The following types of tests are distinguishable on the basis of purpose:

I. Tests of mental ability or capacity to learn

A. Intelligence

Group tests of intelligence given to a number of pupils at one time, the results expressed as point scores to be interpreted in terms of percentiles, age or grade norms. An illustration is the Otis Self-Administering Test.

Individual tests of mental capacity, results of which are usually expressed in terms of mental age or performance level. These tests are illustrated by the Stanford Revision of the Binet-Simon Scale.

B. Special aptitude

Measures of mechanical ability, trade and clerical skills, talent for music and drawing, language ability, aptitude for separate school subjects, motor skills. Reliable measurement of these aptitudes and talents furnishes a basis for educational and vocational guidance. Examples of such tests are the Stenquist Mechanical Aptitude Tests, the Seashore Measures of Musical Talent, and the Orleans-Solomon Latin Prognosis Test.

II. Scholastic achievement

- A.** Survey tests designed for measuring average achievement of large numbers of pupils as expeditiously as possible. Tests of this type are sufficiently reliable for measurement of the average ability of groups, but the scores for individual pupils do not necessarily have high reliability. The Otis Arithmetic Reasoning Test belongs to this category.
- B.** Composite and general achievement tests, which are more reliable than survey tests for indicating the achievement status of individual pupils in one or more school subjects. The New Stanford Achievement Tests are illustrative. Several tests combine the measurement of achievement and mental ability. An illustration of this type is the Otis Classification Test.
- C.** Analytical achievement tests in which the test is divided into several parts, each part covering one specific phase of the subject. By comparing scores in the different parts the

achievement of the class as a whole, as well as of each pupil, may be analyzed. The total score on such a test may be used as a general measure of achievement in the subject. The analysis may be sufficiently reliable for average achievement of a group, or of individual pupils, depending on the comprehensiveness of the content. The Schorling-Clark-Potter Arithmetic Test and the New York Latin Achievement Test illustrate this type.

- D. Inventory tests to be used in taking stock of the capacities and achievements of pupils preparatory to instruction in a new process or skill or the beginning of diagnostic and remedial work. An example of this type of test is found in the Wisconsin Inventory Tests in Arithmetic. Tests for pupil readiness for formal instruction in reading and spelling are also of this type.
- E. Diagnostic tests designed for making analyses of pupil habits and methods of work in specific skills so that the reasons for poor progress or lack of progress may be ascertained. The Buswell-John Diagnostic Chart for Individual Difficulties in Fundamental Processes in Arithmetic illustrates this type of test.
- F. Instructional tests, which are testing and teaching devices combined. The tests are organized in units covering different phases of subject matter. The tests may give pupils opportunity for drill on specific processes and often contain checks for measuring progress at frequent intervals. The results are used for determining the instructional needs of pupils

and the modification of teaching procedures. The Schorling-Clark-Potter Instructional Tests in Arithmetic and the Glenn-Welton Instructional Tests in Chemistry may be cited as illustrations of this type of test.

- III. Tests of personality and character traits. Included in this category are tests of emotional stability, social adjustment, honesty, trustworthiness, and other character traits, interests and attitudes, dynamic qualities. Illustrations are the tests of deception devised by Hartshorne and May, the Pressey X-O Test for Investigating the Emotions, Watson's Test of Public Opinion.

Another group of tests comprises measures of sensory and motor capacities. It is difficult to determine whether tests in this category measure physical or mental traits. Much overlapping is inevitable. Most tests of motor capacity, such as those described in Whipple's *Manual of Mental and Physical Tests, Simpler Processes*, measure both [mental and physical capacities. These tests are useful to physicians, neurologists, and anthropologists, as well as to psychologists.

TESTS DIFFERENTIATED ON THE BASIS OF CONTENT,
FORM, AND ORGANIZATION

The second-mentioned type of classification differentiates tests on the basis of content, form, or organization. Such classification may be illustrated in the case of tests of mental ability, which may be classified as "verbal" in contrast to "non-language" or "performance" tests. Some tests are of the pencil-and-paper variety, demanding a written response in words or check marks. Others are performance tests, consisting of form boards to be manipulated as in the Pintner-Paterson scale, cards to be shuffled, or blocks to be

tapped, the examiner making any necessary record with pencil and paper. Tests may be single, multiple, or composite. The single type of test is illustrated by the Porteus Maze, the Kohs Block Design Test, or the Goodenough drawing-a-man test. In all these tests only one type of response is called for throughout.

A multiple or composite test consists of a variety of test materials of different types, which will ordinarily require varied types of response on the part of the examinee. The original Binet scale, and its numerous revisions, is a multiple-type test, as are most pencil-and-paper tests designed to measure a variety of mental functions.

Some tests are constructed and organized so as to measure the level of difficulty that a person can reach in the performance of various functions; others measure the amount of performance of a particular type within a given time or the time taken to do a particular task; and still others measure the quality of performance.

WHAT IS MEANT BY MEASURING INTELLIGENCE

It is not always possible to identify or name the function measured. Psychologists are frequently at a loss to know whether they are measuring educability or the results of education. There is some confusion on the part of both psychologists and the general public as to the correct use of the term "mental test." The term is now commonly used to describe all tests of any phase of performance involving the activity of the cerebrum. Thus intelligence tests, educational tests, character tests, and trade or clerical tests are all considered by some psychologists as mental tests.

Psychologists are not in agreement as to what intelligence is, how it is constituted, or how it functions. This fact does not, however, prevent the use of the concept and the measurement of the mental product which is recognized

as intelligent behavior in contrast to unintelligent behavior. It is assumed that in comparing the behavior of persons of similar age and opportunity such differences as are found may be attributed to differences in so-called native ability. This ability is measured in one of two ways or by a combination of both: (1) through testing the individual in entirely novel experiences, or (2) through making use in tests of situations which are common to the past experience of all the children tested, the assumption being that, given the opportunity, failure to learn must be attributed to lack of ability or mental maturity.

The determination of what a test measures rests upon its validity. This can be determined in part by the extent to which the results of the test correspond with some externally determined criterion of the trait in question. For example, a test purporting to measure the intelligence of pupils, if a valid measure of such performance, corresponds in a high degree with other reliable measures and careful estimates of mental ability.

Tests differ in method of standardization and the form in which the norms are presented. In the Binet test and some of its revisions each individual test is standardized on an age basis, and the various test items are located in the age group in which the test was passed by approximately two thirds to three fourths of the children tested. Binet revisions which are standardized on a point-scale basis allot a certain number of points to different performances, each individual's total points being in turn converted into a percentile or mental-age rating. The majority of the pencil-and-paper tests yield point scores to be interpreted as mental ages by means of tables of norms or standards.

The most common forms of test norms are in terms of chronological age or school grade. Some tests include norms of only one of these types; others include both. Norms can

be computed for any category of individuals if a large enough group of each different type is tested. Thus it is possible for the norms of some tests to be expressed in terms of what high school students, college or normal school students, and university graduate students accomplish. Or it is possible to have norms for different occupational groups, so that the individual's score can be interpreted in terms of the achievement or ability of laborers, farmers, street-car conductors, stenographers, or clergymen, etc. Occasionally norms are presented for the sexes separately so that an individual's score can be compared with the scores of boys and girls, respectively.

GROUP TESTS CONTRASTED WITH INDIVIDUAL TESTS

Some tests are known as group tests; some, as individual tests. Group tests, as the term indicates, are designed to be administered to groups of individuals, the maximum size of possible groups depending upon the nature of the tests to be used. The testing of army draftees illustrates the wholesale testing of large groups at a time. The economy of time resulting and the possibility of testing many individuals under the same conditions at the same time are the chief advantages of group testing.

Individual tests, of which those by Binet are the most common examples, must be given to one individual at a time because most of the responses are oral, the examiner must time some of the responses of the examinee, and a record of the examinee's responses must be made in writing during the course of the examination. Individual intelligence tests are considered more reliable than group tests of intelligence because in giving a test individually the examiner is in a better position to judge whether the examinee is doing the best that he is capable of and whether he has any unusual difficulties or handicaps. In the case of the individual examina-

tion the observations of the examinee's reactions are often as significant as the test results themselves. Such observations are almost impossible in the case of the written test administered to a group of pupils at one time.

TESTS AND SCALES DIFFERENTIATED

Scales and tests differ in structure and use. The scale is essentially only a scoring or rating device. For example, in using a composition scale, such as that of Hillegas, the child may be told to write upon the topic, "What I Should Like to Do Next Saturday." The composition scale consists of a series of sample compositions ranked and graded as to excellence. The child's paper is compared with the samples on the scale in turn until the sample is found which most nearly corresponds to his in quality of story value, mechanical correctness, or a combination of factors. The child's paper is then given the score of the sample to which his paper most nearly corresponds.

Scales prove to be of particular value in situations not susceptible to more exact measurement and are used extensively in connection with rating of character and personality traits. Scales are now available for the rating of intelligence, character, emotional and social qualities, as well as for rating homes, neighborhoods, and other environmental factors. A good illustration of a scale for rating personality traits of school children is found in *Genetic Studies of Genius*, Vol. I (255). The Haggerty-Olson-Wickman Behavior Rating Schedules are useful for rating the behavior of school children.

SPECIFIC NEEDS FOR MEASUREMENT IN SCHOOL SITUATIONS

The administering of tests is not in itself usually complicated or difficult, but the selection of tests for specific needs, the interpretation of test results, and the application of

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results in the improvement of instruction are often perplexing problems. The uses of measurement in school administration and instruction have been summarized by a number of investigators.¹

The most frequently mentioned uses of tests may be classified as follows :

1. For administrative purposes, including pupil classification and grade placement, comparisons of groups and schools, determination of the suitability of techniques and procedures, obtaining data for time allotments, determining bases for promotion and obtaining achievement data for reports to parents, administrators, and boards of education.
2. For the supervision of instruction, involving estimation of pupil status and progress, setting up of goals, measuring the attainment of goals, ascertaining suitable methods of teaching for the achievement of the standards set, determining necessary variations in

¹ The chief sources of information are the following :

- Bibliography of Educational and Psychological Tests and Measurements* (United States Bureau of Education Bulletin, 1923, No. 39). Government Printing Office, Washington; 1923.
- Dickson, V. E. *Mental Tests and the Classroom Teacher*. World Book Company, Yonkers-on-Hudson, New York; 1923.
- Freeman, Frank N. *Mental Tests*. Houghton Mifflin Company, Boston; 1926.
- Haggerty, M. E. "Some Uses of Educational Measurements," in *School and Society*, Vol. IV, pages 761-771; November 18, 1916.
- Kallom, A. W. "Intelligence Tests and the Classroom Teacher," in *Journal of Educational Research*, Vol. V, pages 389-399; May, 1922.
- Monroe, W. S. *An Introduction to the Theory of Educational Measurements*. Houghton Mifflin Company, Boston; 1923.
- Pressey, S. L. and L. C. *Introduction to the Use of Standard Tests*. World Book Company, Yonkers-on-Hudson, New York; 1922.
- Ruch, Giles M., and Stoddard, George D. *Tests and Measurements in High School Instruction*. World Book Company, Yonkers-on-Hudson, New York; 1927.
- The Solution of Educational Problems*. (Test Service Bulletin No. 5.) World Book Company, Yonkers-on-Hudson, New York; 1923.
- Wallin, J. E. W. *Clinical and Abnormal Psychology*. Houghton Mifflin Company, Boston; 1927.

emphasis in the course of study for different classes and schools, and determining instructional strength or weakness in teachers.

3. For individual pupil analysis and guidance. The determination of pupil capacity, analysis of defects and difficulties, the determination of special abilities and individual differences.
4. For obtaining pupil data to be used for research purposes.

Test Service Bulletin No. 5 of the Department of Research and Test Service of the World Book Company reports the results of a questionnaire sent to principal users of tests to determine the most commonly mentioned uses. They include:

Classification

Grading and promotion

Extra or double promotion

Diagnosis of individual difficulties

Discovery of bright and dull pupils

Better understanding of pupils

To suggest better teaching methods

To supplement teachers' estimates of ability and achievement

To secure local standards of comparison

Vocational guidance

Educational guidance

Incentive to better teaching

Incentive to better work by pupils

Placement of new pupils

Entrance examinations

For reference in cases of discipline

The Presseys (106) distinguish between the use of tests by teachers, by supervisors, and by superintendents. The teachers are primarily interested in the individual child, the supervisors in group measures and the rating of teachers, superintendents in the relation of the standing of their schools to other school systems. These authors say that the super-

intendent needs tests to measure efficiency, to determine accurate grade placements, to plan educational reorganization, to supply convincing facts, and to provide comparison of entire systems. The supervisor uses tests to determine the progress of pupils in school systems, to compare classes and schools, to determine the causes of differences between classes, and to determine the adequacy of teaching methods. The teacher is interested in the mental ability of pupils and their previous preparation in school subjects, diagnosis of special weaknesses, and remedial instruction.¹

However, the use of tests to show how well the school stands in comparison with other schools must be considered less important than the use of tests to determine the individual child's status and progress from time to time, and that in turn less important than their use in making an analysis of individual achievement for the purpose of improving the pupil's learning.

One of the important uses of tests very frequently overlooked is the need of test results to furnish data for school experimentation. This is felt especially in experimental schools where various educational methods are being subjected to experimentation. Whether the X method or the Y method of teaching subtraction is better cannot be determined by a comparison of classes using the different methods until the facts about the intelligence and previous educational experience of the groups compared are known. The outcomes of the experiment can best be gauged through objective measurement.

Educational applications of tests surpass in number and importance all other uses of psychological measurement. In fact, the need of tests for educational purposes tends to run ahead of the development of reliable tests. The need

¹ *Introduction to the Use of Standard Tests*, pages 20-35, discusses in detail each of the points listed here.

for diagnostic tests, for example, far exceeds the actual supply of reliable diagnostic tests in the different phases of school work. Not all the uses for tests mentioned in the foregoing section can be met with complete success by the present supply of tests.

THE IMPROVEMENT OF MEASUREMENT

Limitations of tests now in use have been described and suggestions for their improvement have been recommended by a number of psychologists. The present need is for improvement rather than extension of measurement. Thorndike (121) suggests that many tests are ambiguous, arbitrary, and in need of improvement from the standpoint of exactness, reliability, and validity. Too frequently tests are not true measures of what they purport to measure.

Tests may be greatly improved by being made more reliable. As a result of a study of the reliability of achievement tests, Symonds¹ has deduced the following conclusions:

A test is apt to be more reliable if it has a large number of items, if it takes a long time, if it has a narrow range of difficulty, if its scaling is even, if it has few interdependent items, if it is objective in scoring, if it is scored accurately, if the factor of chance enters little into securing the correct answers, if the positions of the correct items among the others are carefully guarded against the constant trend on the part of subjects to mark more frequently items in certain positions, if the material is homogeneous, if the material is common to subjects, if it is given late in the school year, if it has little dead material, if it has few catch questions, if it contains subtle factors. The following factors in the variability among the individuals taking the test also affect the reliability: Constancy of the speed of working, variability in accuracy, incentive or effort, the obtrusion of competing ideas, illness, worry, excitement, accidents during examination, and cheating.

¹ From *Psychological Abstracts*, Vol. II, No. 6 (June, 1928), page 392. (A review, by A. M. Jordan, of: P. M. Symonds, "Factors Influencing Test Reliability," in *Journal of Educational Psychology*, Vol. XIX, pages 73-87; February, 1928.)

Published tests, particularly those in reading and content subjects, have been criticized as inferior in quality to the subject matter taught. Too frequently the materials have been hastily gathered and thrown together with little attention to quality, coherency, good form, or relevancy to the subject. Too much time and effort have been spent in "thinking up" clever test questions and novel forms of presentation, and too little study has usually been made of the types of questions and subject matter of most value from both educational and psychological points of view.

Tests have been criticized as contributing to the standardization of educational products. Whether or not this is true depends largely upon the use made of test results. Increased individuality rather than standardization results if the individual differences which tests reveal are given opportunity for development.

One criticism often heard of the newer forms of examinations is that they are so constructed as to prevent the individual tested from showing whether he can reason or organize material. The critics feel that much of value, which is taken care of in the essay-type of test, typified by the usual classroom examination, may be omitted in the short-answer type. The answer to this criticism is that there is probably less difference in what is measured by the two types of examination than most persons suppose, and that any loss in the measurement of ability to organize materials may be more than compensated for by increased reliability.

Laymen often criticize tests because of the frequent conflict of results with such pet notions as "Slow but sure," "Most bright persons were dull children," "Beautiful but dumb"; because of the lack of agreement between the test results and preconceived estimates of intelligence; or because of the notion that intelligence and mental traits are not susceptible to measurement and statistical treatment.

The widespread use of tests has disclosed endless practical possibilities for the educator, anthropologist, business man, and welfare worker. Numerous inferences as to the significance of test results — some of them true, but many false — have consequently been suggested. Test findings have stimulated endless debate as to the nature of racial differences, the abilities of various vocational groups, definitions of feeble-mindedness, the relative influence of nature and nurture on test results. Different workers have at times found apparently contradictory results. Erroneous deductions may often be traced to two sources: errors of sampling and lack of adequate controls in determining causal relationships. With refinement in scientific technique erroneous conclusions due to these sources may eventually be corrected.

Tests have been criticized because they measure only limited phases of child behavior. Psychologists recognize this limitation. A thirty-minute test is a brief sampling of a child's capacity or achievement. Psychologists realize too that tests are not available for measuring all phases of personality. Lacking adequate and reliable measures of all personality traits, the importance of supplementing the study of the behavior of school children by other means than measurement cannot be too much emphasized. A study of the spontaneous behavior of a child on the playground or in the classroom for a fairly long period of time is a good way to gain important supplementary information. It is possible to control these observations in such a way that they will be of more value than undirected or unskilled observation might be. The work of Rogers (162) and of Andrus (131) in this direction should be extended so as to be applicable to school children above the primary grades.

Testing must be considered only one of several ways of gaining information about school children. To observe, describe, and understand the total behavior of any child is

a tremendous task which will never be accomplished solely by the administration of tests.

QUESTIONS AND TOPICS FOR FURTHER STUDY

1. List the chief differences between standardized tests and ordinary classroom examinations.

2. Suggest ways in which teachers can improve classroom examinations.

3. Have a teacher of one of the elementary grades estimate after a term's work the intelligence and achievement of the pupils. Use the best available tests to measure the ability and achievement of the children. How do the two ratings compare? Suggest factors which explain the discrepancies.

4. Collect photographs of fifteen children whose intelligence has been measured. Ask a class of students to rate them for intelligence. Compare the ratings with the actual measures of intelligence.

5. One member of the board of education is doubtful of the value of mental tests. What arguments would you offer to convince him of their value?

6. In what way can extensive use of tests save the school system money?

7. Do standardized tests necessarily make for standardized educational procedure?

8. What are the characteristics of a satisfactory standardized test?

9. Find a number of definitions of intelligence given by different authorities. How do they compare? Do you agree or disagree with them? Why?

10. List several indications of intelligence in children, apart from data furnished by test results.

11. What are the possibilities in measuring pupil capacity and achievement in an elementary school in which the population is largely foreign? Is it fair to test foreign-born children with tests standardized for English-speaking children?

12. What are the chief advantages to be derived from giving individual examinations such as the Binet test? What are the special advantages in giving group tests such as the National Intelligence Test? List situations in which group tests would be more useful. List those in which individual examinations would be more useful.

13. Attempt the rating of such a trait as sociability in a class of school children. How do you go about making the necessary scale, and how do you use it in rating one particular child?

14. From the test bibliography on pages 281-310 make a suitable list of tests for kindergarten children. (Use any other bibliographies to which you have recourse.)

15. In some of the schools in Russia classroom examinations are never used in the elementary schools and school marks are not given. Comment on the advantages or disadvantages of this practice.

CHAPTER FOUR

THE ADMINISTRATION OF TESTS

FOR successful outcomes from the use of standardized tests, careful preparation and concerted effort are required. The organization of the testing program should be in harmony with the needs of the school and the facilities at the disposal of administrators. Problems are similar in different schools. It is possible, therefore, to suggest general principles of test program organization.

Testing programs of both achievement and mental ability yield more satisfactory results if the following procedures are observed :

1. There should be a real purpose for using the tests, and that purpose should be formulated at the outset. Testing activities should usually be organized in the form of a project or program.
2. All the persons in any way concerned in the testing should be instructed as to the purposes to be served, the need for the fullest coöperation of all concerned, and the part for which each individual is responsible. If there is opposition to the program on the part of persons whose coöperation is necessary, this opposition must be overcome if the work is to be successful.
3. Suitable tests should be chosen for the purposes to be served.
4. The tests should be correctly administered and properly scored by adequately trained persons.
5. Results should be subjected to appropriate statistical treatment and presented so as to reveal significant outcomes.
6. The results should be interpreted for the persons who are to use them, and they should be translated into

schoolroom practice, as, for example, through reclassification of pupils, the organization of special classes, further diagnosis of pupil needs, and recommendations for remedial work. A testing program is rarely worth the time, effort, and money expended if it does not result in some worth-while modification in classroom procedures and practices, materials and methods of instruction, class and school organization and management, or some other phase of the school work.

THE IMPORTANCE OF A WELL-ORGANIZED PROGRAM

Under some circumstances a formal survey should be carried on in contrast to occasional testing of particular pupils or special groups at irregular intervals. In general, a testing program or survey should be conducted whenever it is desirable to measure large numbers of pupils at one time for any purpose. The need may arise when there has been no previous testing work carried on and information about large numbers of pupils is desired as quickly as possible, when there has been no previous testing over a long period of time, when it is desirable to study an entire school or school system, or when changes in administration take place. In progressive schools a yearly measurement of the achievement of all the pupils, particularly of those in the elementary school, and of mental ability of pupils at crucial points — entrance to first, fourth, seventh, and ninth grades — is considered absolutely essential.

Some school systems find it difficult or unnecessary to conduct complete surveys annually throughout the elementary and junior high school grades. In such cases experts agree that the school grades in which testing is most important are the first grade and kindergarten, the third grade, the sixth or eighth — depending upon the type of school organization — and the twelfth grade.

The minimum requirements for a survey of ability and achievement are tests of reading, arithmetic, and spelling, and tests of general intelligence. The results of the different tests should be related in such a way as to make them comparable. If facilities are lacking for complete surveys of intelligence and achievement, a sensible procedure is to confine the testing to measurement of school achievement except in the case of pupils who are noticeably deficient for age and grade in any skill. Such children should be given intelligence tests in addition to achievement tests in order to determine the causes of deficiencies.

REGULAR TESTING SHOULD SUPPLEMENT VOLUNTARY
TESTING BY TEACHERS

Whether or not the testing work should be left on a voluntary basis, tests being given only when teachers ask for them, is a debatable question. Some authorities recommend that the work should be wholly voluntary; others believe that at least the introduction of measurements must be on a voluntary basis. There are other administrators who suggest that at certain times a regular program or survey should be carried through whether teachers and principals ask for it or not, but at other times teachers should be permitted to make use of measurements at their own discretion. Some experts insist that all testing work should be planned at the beginning of each year, or period of years, and carried through with little attention to special requests. The second alternative is obviously the most satisfactory one. There should be a well-thought-out plan for the testing, with which nothing is allowed to interfere. And yet at the same time provision must be made, supplementary to the regular program, for meeting special needs as they arise. These special needs cannot always be anticipated.

If the program is left wholly on a voluntary basis, the results will not usually be entirely satisfactory unless the school staff is particularly enlightened. There will be no uniform items of information about individual pupils necessary for comparison and classification; records will lack consistency; little effort will be made to translate the test results into school practice; and the teachers whose groups are most in need of measurement may not receive attention. If, on the other hand, the testing is placed solely on a compulsory basis and conducted by a supervisory staff with little coöperation expected from the teachers, the results may be equally bad. The teaching staff may be antagonized so as to defeat the ultimate purpose of the whole program. Unless the teachers feel that they may have something to say in the work, or unless they have been educated concerning the program to the point where they can appreciate its importance and purpose, the outcomes will almost invariably be unsatisfactory.

Permitting teachers to choose and use any tests indiscriminately is indefensible and may result in great economic waste to the school. Supervision of testing is as important as supervision of instruction. Teachers are not usually permitted to adopt any method they care to or to use any materials that happen to strike their fancy. Although in the best schools opportunity is always allowed for the exercise of the teacher's discretion in such matters, there is always some supervision to relate the work of each particular teacher to the activities of the whole school, thus insuring proper integration and uniformity in the program.

Terman (117) has described the administration of a testing program in a small school system. A selling campaign was instituted as one of the initial phases of the work. The teachers' opinions were consulted, and charts were prepared showing the tendency toward unreliability in teachers' judgments. The types of changes that might result and the bene-

fits to be derived from the survey were explained to the Rotary Club, and the school board was kept in touch with the movement. Special classes were formed as a result of the survey.

In the Lincoln School of Teachers College, New York, a survey of the intelligence of all pupils from the first grade through the twelfth is conducted at the beginning of each school year. This is accompanied by a survey of the educational achievement of pupils in the elementary and junior high schools. Achievement is again tested at the middle and close of the year. A more complete survey is made of the capacities and achievements of first-grade entering pupils. At the beginning of the year use is made of several primary intelligence tests, performance tests, a simple reading test, and reading, writing, and number "readiness" tests. These results are supplemented in special cases by individual intelligence and diagnostic tests in the tool subjects, by questionnaires, and by rating scales.

ADMINISTERING THE TESTING PROGRAM

The success of a testing program depends largely on the training and experience of those in charge. There are several alternatives in the choice of personnel. The possibilities include: (1) a bureau of research established within the school system, with staff members in charge of measurement; (2) psychologists in the employ of the school; (3) superintendents, supervisors, principals, or teachers; (4) an expert called in from outside the school system, such as a university instructor assisted by his students, or a member of the state education department.

Many progressive administrators favor a continuous mental survey with experts in charge of the work and the activities organized in a department of research, measurement, or child study, when the school enrollment is large enough to

justify the expenditure. The central office conducts the testing involved in the larger administrative and supervisory problems, and it instructs and assists in the major part of the testing connected with instructional problems. The supervision of measurement by a central bureau insures unity in the testing program and facilitates the widespread use of measurements in the large city centers.

Extreme centralization may, however, defeat the very purpose for which the tests are used — namely, the improvement of instruction and pupil adjustment. It is therefore important that the central bureau operate in such a way that teachers derive benefit from the testing program as speedily as possible. A method of effecting this result is described by Stenquist (31). In the larger cities psychologists or measurement specialists operate from the central bureau in a single school building. They specialize on the types of problems characteristic of the particular school. Such an arrangement insures the prompt application of results to pupil problems.

THE PARTICIPATION OF TEACHERS IN THE TESTING PROGRAM

There seems to be rather general agreement that, in spite of several disadvantages of the administration of tests by teachers, teachers should have some part in the actual giving of tests. This is true particularly in giving group educational and intelligence tests or other tests in which directions are brief and are to be given verbatim and in which the interpretation of results is little affected by the personal element. Usually a school system undertaking a general testing program in which much group testing is to be done is unable to conduct the program without the enlistment of teacher aid. The chief advantages in the use of tests by teachers are the increased interest of teachers in measurement in general and in the results of the immediate program in particular, econ-

omy in administering the survey, the assumption by teachers of a legitimate responsibility, and the more direct application of test results to classroom problems.

There is also quite general agreement that the administration of such individual tests as revisions of the Binet scale and intricate performance tests should be given and interpreted only by experts. Their use in differential diagnosis by the untrained or semi-trained person is considered detrimental to the best results. Often a pupil's response to the question may be of less significance than the manner in which the response is given. The interpretation of the qualitative aspects of the response requires the services of the trained psychologist. Teachers, even when qualified, seldom give individual tests because of the fact that their duties are primarily with the classroom group and leave little opportunity for working with an individual child apart from this group.

If teachers wish to make use of standardized tests, they should cease to be teachers while administering the tests. During the actual administration of a test it is often difficult for the teacher to refrain from answering the pupils' questions concerning the correct answers, and the pupils may become confused by the unnaturalness of the situation if the teacher refuses help. It is exceedingly difficult for the teacher to set aside her habitual attitudes toward the pupils' questioning, particularly when the children are to be rated according to their performances on the test. In the test scoring too it is difficult for the teacher to refrain from overlooking the pupils' errors or giving credit where none is earned. A teacher recently criticized a psychologist for being too cold and heartless during the administering of a test. It seemed cruel to the teacher to refuse the pupils' requests for assistance.

Many textbooks on measurement, though obviously designed for the uninitiated, do not simplify the situation. The suggestions given and the rules laid down actually re-

quire a broad background of knowledge. Many of the test manuals and bulletins published as aids to the tester are insufficient in themselves as sources of information on this point. This fact is frequently overlooked both by the publishers of such materials and by the persons who make use of them.

Many teachers and supervisors are quite unfamiliar with the principles of measurement, or they possess only superficial information about test conditions, in which case they are clearly unfitted, without further study, for much active participation in the administering and interpreting of standardized tests. If teachers are to have some part in measurement, then provision must be made, in their training courses or through subsequent study, for their acquisition of more than a casual acquaintance with measurement.

CRITERIA FOR THE SELECTION OF TESTS

Dozens of new tests make their appearance each year. Hundreds of titles are listed in bibliographies of tests and scales. How can the person who wishes to use measurements intelligently in educational work make proper selections from so large and varied a supply? Not all the tests listed can be of equal value for the purposes for which they are intended.

In choosing the most suitable tests for educational purposes, the person making the choice must consider the needs to be met, the time for testing at his disposal, the allowance for measurement in the school budget, and the types of children to be tested. After all these factors have been taken into consideration, the prospective user of tests may still find several tests which appear to be equally suitable for his purposes. To guide him in making selections of suitable tests, the most important criteria in the opinions of experts are the following :

1. Validity, including the suitable scaling and proper construction of the test and, in the case of achievement tests, the suitability or relevancy in view of the prevailing curriculum.
2. Reliability.
3. Ease of administering and scoring.
4. Expense in relation to the importance to be attached to the results.
5. Suitability of material from pedagogical and psychological points of view, mechanical make-up, organization, length, form, typography.
6. General utility for the study of classroom problems.
7. Ease of interpretation of the results of the test.
8. Degree to which the test differentiates among different levels of achievement or ability.
9. Adequate standardization.
10. The possibility of obtaining several equivalent forms.

Test Service Bulletin No. 13, published by the World Book Company, contains a scale for the rating of tests. Directions are given in the bulletin for the use of the scale. Ten main points are listed for the scoring of tests, and the scores are allotted in such a way that the total score for the best tests would equal 100. The ten scoring points and the allotted weights are as follows:

Manual of directions furnished	5
Validity	15
Reliability	10
Reputation	5
Ease of administration	15
Ease of scoring	15
Ease of interpretation	15
Convenience of packages	5
Typography and make-up	5
Test service	10

In his early work in connection with the construction of a scale for the measurement of intelligence Binet suggested that tests should include the measurement of a large number of functions, that they should be adapted to the social environment in which the subject lives, and that they should not fatigue the subject or require expensive apparatus. Today these suggestions are still pertinent to matters of test construction and selection.

Some experimental work has already been undertaken to determine the relative value of tests within any one category. A study conducted by the New York Society for Experimental Study of Education (73) to determine the relative merits of a series of kindergarten and first-grade intelligence tests is an example of such work. In this study the correlation technique is employed for the determination of the reliability and validity of the tests studied. Further studies of this kind are needed for all categories of tests.

An individual test or measure of a single factor cannot necessarily be said to be superior or inferior to a group or composite test. In determining relative value the points to be considered are, first, the uses to be made of the tests, and second, their reliability and validity. Some group tests may actually be more reliable than certain types of individual examinations, particularly for the higher levels of ability. If, however, the tests are to be used in any other than the standard way or for a different purpose, this statement would not necessarily be true.

SCORING TESTS

Several alternatives are possible for test scoring. In some schools all scoring is done by teachers; in others it is done by clerks, by capable high school students during their free time, by outside help obtained from a research department, or by normal school or university students.

The scoring of tests by teachers is usually conceded to be a waste of their time. However, teachers should do enough of the scoring to acquaint themselves with the procedure and to understand the significance of the scores. If batteries of tests or tests containing several subdivisions are to be scored, economy of time is gained by having teachers work in groups, each teacher being assigned a limited scoring task.

When teachers are required to score tests, the supposition is that the teacher gains a great deal of useful information about the pupils. This is seldom true, since the mere scoring of the papers without the interpretation of results in terms of the class median, percentile rank or age, and grade equivalents will tell the teacher very little. Most schools find it necessary, however, to assign the scoring of achievement tests to teachers.

In the city schools of Baltimore the teachers score all group tests. The director of research believes that only in this way will teachers show maximum interest and have test results quickly available. Since they will use the results more than anyone else, it is argued that they should be the first to have them. Teachers also list results and return them to the central office. The method of handling test results as worked out in Baltimore appears to be the most satisfactory scheme for a large city school system.

A study of test scoring reported by Pintner (102) reveals the fact that even experienced examiners and scorers make serious errors and show deviations in method of scoring. With comparatively inexperienced scorers the number and variety of errors are much greater. Careful training and extensive experience tend to reduce errors. It is possible to check the amount of time necessary to score different tests in advance and from this calculation to estimate the amount of time required for the job. Having this information, an economical scoring schedule can be worked out.

READJUSTMENT FOLLOWING THE TESTING PROGRAM

Test surveys are conducted for the purpose of revealing the status and progress of pupils. The results, when interpreted, usually reveal situations needing change or improvement. These include:

1. Reclassification of pupils.
2. Further study of individual pupils.
3. Revision of the curriculum to meet pupils' needs more fully.
4. Differentiation of instruction and formation of special classes.
5. Remedial work for individual pupils and groups of pupils.
6. Improvement of instructional methods and materials.

These topics will be discussed in later chapters.

THE TEACHER'S NEED FOR TEST RESULTS

In some schools there is general complaint that teachers have little share in the measurement program, that they seldom learn the results until it is too late to apply them in the improvement of instruction, that school authorities withhold measurement results which would be enlightening. Some authorities withhold results from teachers with the belief that to disclose them would only prejudice the teacher against the child before she has a chance to become well acquainted with him. This difficulty can be obviated by adhering to the following rule: Give to teachers in understandable terms such information from test results as has been reliably determined, results which the teacher would be almost certain to discover for herself in the course of the year, data which would be of material assistance to the teacher in working with the child, data which correlate highly with other facts already discovered about the child.

For example, a child in the third grade is of average intelligence as compared with the rest of the group but has made very slow progress in reading because of many absences during the course of previous instruction. Reading tests have been given to the child from time to time in the first and second grades. Such information as the tests provide should not be withheld from the teacher but should be available for her in interpreted form on the child's first day in the third grade. If the facts have been reliably determined, the teacher will probably discover the same ones herself by the end of the term. The facts as revealed by the tests correspond with the opinions of former teachers and parents, and the test data will be of enormous value to the teacher if she can utilize them from the beginning of the term. To keep her ignorant of the true facts in order to keep her from "being prejudiced" will result in her beginning the instruction of the particular child with the assumption that the child is normal with respect to reading status and possible rate of progress. Such a situation is wholly unfair to the child and wasteful from an educational point of view. Lack of knowledge of the situation may prejudice the teacher against the child. She may label him as dull or lazy, whereas a knowledge of the facts might make her more sympathetic.

The teacher needs (1) knowledge of the facts about the capacity and achievement status of new pupils; (2) diagnostic, or at least analytical, data for pupils with peculiar difficulties and irregularities in achievement; (3) measures of the progress of pupils over a given period of time; (4) knowledge of a child's achievement as compared with his capacity; (5) test data as a basis for school experimentation. The possession by teachers of all these data coupled with proper knowledge as to their use in instruction results in greater efficiency in obtaining results commensurate with the effort expended.

One question frequently asked is whether teachers should know their pupils' IQ's. A variety of opinion has been expressed in answer to this question. Practice varies all the way from keeping all intelligence test records under lock and key in the superintendent's office, the results being disclosed only in case of emergency, to the scheme described by one psychologist of making a seating plan for the classroom with each IQ carefully noted. The most practicable scheme is that of expressing IQ's in terms of letter ratings and disclosing them to teachers when such information is furnished by a reliable test and when teachers are handicapped for lack of this knowledge in working with the child. It may be disturbing to a teacher to be told at one time that a pupil's IQ is 90, and at another time—after a second test has been given—that it is 100. It is more useful and less confusing to the teacher to know that the child has C ability in a fivefold letter rating scheme. Or if more exact information is needed by the teacher, a rank-order list of all the pupils in a class may be given to her. This can be done without disclosing the numerical values of the computed IQ's. There is a statistical hazard in fastening to a particular child a numerical value which contains within itself a sizable error or considerable amount of unreliability.

DETAILS IN THE ADMINISTRATION OF INDIVIDUAL TESTS

The administering of some individual mental tests demands skill and tact on the part of the examiner to a greater extent than is required in the administration of group tests. To the child the situation is usually unfamiliar and quite unlike the situation that confronts him daily in the classroom or at home. The responsibility for successful test results rests quite largely with the examiner.

One of the most comprehensive and at the same time detailed accounts of the problems confronting the adminis-

trators of individual examinations is given by Wells (125). Other suggestions of value have been offered by Bronner and others (45), Kuhlmann (84), Town (32). Among the suggestions proposed are:

1. Provision for right surroundings.
2. Controlling the subject and establishing rapport so as to get the best response.
3. Correct administering and scoring of the test. Accuracy in giving directions. Sufficient familiarity with the tests so as not to have to distract or delay the examinee.
4. Use of correct chronological age in computing results.
5. Knowledge of how and when to modify the test to meet unforeseen exigencies as they arise.

Bronner gives several supplementary suggestions. She mentions (1) stopping the examination when the subject is fatigued; (2) refusing admission to the examination to all persons except the one being examined; (3) withholding the actual results of the examination from the individual examined; and (4) avoiding the recording of responses in the subject's presence.

There is no general agreement as to the time to be spent in preparation for learning the Binet procedure and interpreting the results intelligently. Town, Stern, Wallin, and Mateer advocate highly specialized training on the part of persons using the tests. Goddard, Terman, Kohs, and many others believe that an intelligent person, not necessarily a psychologist, can learn to use the tests and can make proper use of them after a comparatively short period of training. All agree, however, that *the clinical study of the individual, in which tests play a very important part, should be undertaken only by the expert with a broad background of psychological training.*

It is detrimental to the test results for an examiner to attempt to crowd half a dozen or more tests into a day of examining. It is difficult for an examiner to test for five or six hours in succession without becoming too fatigued to do more than to record responses and give instructions in purely mechanical fashion. Mental and physical fatigue resulting in lack of attention and writer's cramp may be some of the outcomes. Careless testing is sure to result. When fatigue sets in, the examiner also has a tendency to shorten the examinations as much as possible with the result that the test may not be carried as far up and down the scale as the situation requires.

Frequently the examiner encounters a child who has been coached on the whole test or specific parts. Under some circumstances he may prefer to continue the test and interpret the result with allowance for the suspected coaching. Possible alternatives when a child appears to have been coached are (1) the administering of other revisions of the Binet tests, (2) the administering of group intelligence tests, (3) judgment of the child's ability and maturity, taking into account his age and opportunity for experiences.

CONDITIONS FOR GIVING TESTS

Too much emphasis cannot be placed upon the importance of providing the best physical conditions for the tests. Usually the worst conditions prevail. Few schools have been built with specially designed laboratories for the administration of tests. Cloakrooms, hallways, basement rooms, closets, or offices — shared with others — in which typewriters bang and telephones ring are usually the lot of even the expert examiner. One progressive experimental school in New York is a notable exception in this respect. In the new building recently constructed by this school the psychologist was asked to submit suggestions for suitable testing

accommodations. The result was a suite of rooms, connecting, but sound proof, for the psychologist's services.

Lighting conditions, ventilation, seating arrangements, observance of rest periods, freedom on the part of the child from bodily discomforts, all require attention in the administering of tests. Experts agree that, except in unusual circumstances, examinations should not be given at recess, after school, or during gymnasium periods when the pupil might be disappointed at missing an interesting activity.

For a thorough mental examination Bronner suggests two alternatives — a minimum schedule and a longer schedule. A total of eight hours she considers necessary for the adequate testing of an individual. This amount of time may seem to be an extravagance when one considers the practical limitations involved; but Dr. Bronner thinks it will not appear an extravagance when considered in comparison with the time and money spent by people in finding out what is wrong with an automobile.

Parents or visitors should usually be excluded from the testing room. In the case of nursery school children, however, Gesell believes that parents may be present and even hold the children, since this is the normal situation for the child. In the case of children of elementary school age there is seldom any situation in which the parent's presence is necessary or desirable. Other visitors should, without question, be excluded from the examination unless children are being tested for demonstration purposes. Parents who insist upon coming with the child are usually willing, if tactfully approached, to busy themselves in visiting the school or in filling out information questionnaires in an adjoining room.

In the case of individual examinations, when there is opportunity for conversation between the examinee and the examiner, there is often too much talking to the child and too much urging on the part of the examiner. This excessive verbosity

is confusing to the examinee and may actually spoil the examination. The younger the child, the more is excessive urging likely to result in negativisms on his part. Frequently the examiner is tense, nervous, too intent on the task, or oversensitive as to his part in obtaining good results. Increased practice should result in improved technique if the examiner makes a conscious effort to profit from his mistakes.

In the administering of the Stanford Binet tests several psychologists have proposed suggestions for variations in the usual order of giving the tests. One grouping of the test items has been suggested by Mateer (239). Another arrangement has been proposed by Hollingworth (227). Wells (125) mentions exceptions to the usual order of giving the tests. The different orders proposed usually group all the tests of one kind together. Thus the repeating of digits, the arithmetic problems, or the similarities and differences are sometimes given in blocks rather than in the age levels in which they would ordinarily occur.

It is important for the examiner not only to know the order of the tests but to recognize the age level to which each test belongs. For example, to give definitions of objects superior to use is recognized as a performance of the eight-year level, or to be able to interpret pictures is a successful twelve-year-old response.

The Yerkes-Bridges and the Herring point-scale revisions of the Binet tests are arranged in a systematic order that differs greatly from the order of the separate test items of the Stanford Binet.

RECORDING RESULTS

Blanks for recording results on the revisions of the Binet tests are available.¹ For one very familiar with the tests a

¹ The publishers of the various revisions of the Binet tests are given in the Bibliography on pages 281-310. These publishers provide the blanks to be used with the respective tests.

record form which contains abbreviated statements of the items and adequate space for the recording of responses may be substituted. Many adaptations of such blanks have been constructed by different examiners. Wells gives descriptions of several of the alternative forms. The usefulness of the type of blank that can be selected will depend upon the filing space available, the examiner's familiarity with the test, and the extensiveness of the notes to be recorded.

It is important to do the scoring of tests and to write up the notes before too long an interval of time has elapsed after the tests were given. Otherwise much valuable information may be lost, and the results will not be so accurate as they should be. The organization of the notes for purposes of record varies greatly with different examiners. Some examiners prefer to record all notes in essay style with little classification of the items recorded. Others find some organization of the material very desirable. Occasionally a bare outline of the most important features of the examination placed on a small filing card meets the need adequately. The arrangement preferred by Bronner is the presentation, first, of the objective findings of the examination, followed by the observation notes on the general examination and the interview which took place at the time the test was given. In one school some use has been made of a blank in which the notes are classified under mental, social, and emotional qualities. It is usually wise to place at the head of the report, so that the items stand out from the rest of the notes, the statistical results of the examination, the child's chronological age, the mental age, the intelligence quotient, the date of the examination, the child's school grade, and any other important items which are necessary in interpreting the result. Wells (125) distinguishes the following types of behavior in the individual examination: willingness, effort, physical activity,

speech, autocriticism, attention, and the understanding of directions.

An extended scoring key for use with the Stanford Revision of the Binet tests has been prepared by Pintner and his students at Teachers College, Columbia University. This key adheres to the standard directions given for the scoring of the tests by Terman but includes the scoring of doubtful points not covered in *The Measurement of Intelligence*. These scorings have been derived from the vote of large numbers of graduate students in connection with their use of the tests.

In giving the Stanford Binet tests, a question frequently arises concerning the proper chronological age to use in computing the IQ for individuals who are more than fourteen years of age. Terman adheres to the rule of dividing by 16 in the case of a child sixteen or more years old, whereas many other psychologists consider 14 the proper figure to use. Some experimental evidence is now being collected which in time will throw further light on the problem. Terman (255) has formulated empirically a method of arbitrarily increasing the mental ages of some individuals, on the basis of the number of tests passed in the two upper levels of the test, so that they will not be penalized because of the lack of a more difficult level on which they might have been examined.

MISUSE OF TESTS AND SOURCES OF ERROR IN ADMINISTERING THEM

Inexpert administering is probably the source of most of the errors made in the use of tests. These errors include inaccurate timing, tenseness, lack of interest, affected manner on the part of the examiner, poor enunciation, incorrect reading of directions, poor discipline, bad physical conditions, errors in scoring, and coaching. Kohs has found the following sources of error in the use of individual examinations: lack of adherence to formula, lack of rapport with the sub-

ject, fear on the part of the subject, poor arrangement of materials, examiner's lack of familiarity with the test. In the scoring of group tests mistakes may be due to failure to follow scoring directions, failure to use common sense when the directions do not cover a particular case, errors in arithmetical computation. Errors may result from failure to get the correct birth date, from inaccuracy in computing the mental age or IQ, and from incorrect interpretation of the subject's responses.

Many errors in the use of educational measurements come about through interpretation of test results in terms of age and grade norms. Published norms for educational or achievement tests usually represent averages for large groups of unselected children of different grades or ages scattered over wide territory in communities that differ greatly. Such averages are not to be thought of as standards in the sense of goals to be reached in the course of instruction. They represent mediocrity in learning rather than the desired attainment. It is essential that different schools set up their own goals or standards of achievement quite apart from published test norms, making use of such norms only for the purposes of general orientation. Although we can state with some assurance that by the end of the sixth grade the average and normal child should show certain definite accomplishment in comprehension and rate of reading if he is to do effective work in higher grades, and although on the whole we may define national and even international standards in arithmetic computation which sixth- or seventh-grade pupils should have attained, nevertheless the concept of "grade" varies so markedly from school to school and city to city and the needs of pupils are so diverse that grade norms may have little value as goals in teaching. Age norms are useful chiefly in comparing the central tendencies of groups, but are open to the same objections when used as goals of instruction. A more

complete discussion of the use of norms is given in *Test Service Bulletin No. 21*, published by the World Book Company.

Misuse of educational measurements is illustrated by the comment of the city school supervisor who remarked, "Oh, yes, our educational situation is entirely satisfactory. We were above the norms throughout the grades in the educational survey tests given in our school recently." Justifying an antiquated curriculum from the results of national norms for standardized tests is to be condemned.

Our whole tendency has been to determine average achievement for the country as a whole, a section of it, or an entire state, and then to evaluate the achievement of a small unit in terms of these results. Aside from the fact that it is impossible to obtain norms that are really valid from this standpoint, the interpretation is not of much value, is misleading, and may be educationally harmful to the individual pupils and teachers as well as to the school system as a whole.

In order to interpret the achievement status of his school or school system a principal or superintendent should be interested not so much in a comparison with "average achievement" for the country as a whole as in the highest achievement shown in schools or school systems which are, in other respects, most like his own in size, student population, buildings and equipment, size and wealth of community. If the principal or superintendent could determine the best that is achieved in schools comparable to his own, he would have a measure of what his school should be able to achieve. Illustrations of this method of interpreting test scores are found in two surveys of Latin achievement in New York.¹

¹ Jacob S. Orleans and Harold G. Thompson, *A Survey of Achievement in First Half Year Latin in New York State* (Bulletin No. 892). University of the State of New York, Albany; 1923.

Jacob S. Orleans and Harold G. Thompson, *A Survey of Achievement in Second Half of First Year Latin in New York State* (Bulletin No. 897). University of the State of New York, Albany; 1923.

In these studies the average achievement of the highest 10 and 5 per cents of the public high schools in the state was taken as the criterion for evaluating the achievement of the other schools.

Educational tests need constant revision to meet the needs of a changing curriculum. Tests published a decade ago will usually be unsuited, without revision, for present use as measures of educational attainment. Most of the published educational tests have not been altered to keep pace with changes in the curriculum.

CHECKING THE SCHOOL'S WORK IN MEASUREMENT

A check list of the criteria to be used in evaluating the use of measurements by the school has been prepared at Teachers College, Columbia University, by N. L. Engelhardt and a group of graduate students and is available in mimeographed form (368). Included in the list is a series of statements relating to the use of standardized measurement in the schools. The use of such a check list enables the school system to evaluate its work. Among the points to be checked are the following :

1. The types of measurement used.
2. The organization of the measurement activities.
3. Education of the staff in the value and use of measurements.
4. The selection of tests and scorers.
5. Administrative, supervisory, and instructional uses of test results.

SOURCES OF TEST INFORMATION

Among the most useful books on the subject of psychological measurement, many of which contain extensive test bibliographies giving sources of test materials, the following are recommended :

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- BALLARD, P. B. *Mental Tests*. Hodder and Stoughton, London; 1920.
- BRONNER, AUGUSTA F.; HEALY, WILLIAM; LOWE, GLADYS M.; and SHIMBERG, MYRA E. *Manual of Individual Mental Tests and Testing*. Little, Brown & Co., Boston, 1927.
- BROOKS, FOWLER. *Improving Schools by Standardized Tests*. Houghton Mifflin Company, Boston; 1922.
- BURT, CYRIL. *Mental and Scholastic Tests*. P. S. King and Son, London; 1921.
- DEARBORN, W. F. *Intelligence Tests*. Houghton Mifflin Company, Boston; 1928.
- DECHOLY, O., and BUYSSE, R. *La Pratique des Tests Mentaux*. Alcan, Paris; 1928.
- DICKSON, V. E. *Mental Tests and the Classroom Teacher*. World Book Company, Yonkers-on-Hudson, New York, 1923.
- FREEMAN, FRANK N. *Mental Tests*. Houghton Mifflin Company, Boston; 1920.
- GREENE, HARRY A., and JORGENSEN, A. N. *Use and Interpretation of Educational Tests*. Longmans, Green & Co., New York, 1929.
- GREGORY, C. A. *Fundamentals of Educational Measurements and the Elements of Statistical Method*. D. Appleton & Co., New York; 1922.
- HARTSHORNE, HUGH, and MAY, MARK A. *Studies in Deceit*. Macmillan Company, New York; 1928.
- KELLEY, TRUMAN L. *Interpretation of Educational Measurements*. World Book Company, Yonkers-on-Hudson, New York; 1927.
- KUHLMANN, F. A. *Handbook of Mental Tests*. Warwick and York, Inc., Baltimore; 1922.
- LEVINE, ALBERT J., and MARKS, LOUIS. *Testing Intelligence and Achievement*. Macmillan Company, New York; 1928.
- LINCOLN, E. A. *Beginnings in Educational Measurement*. J. B. Lippincott Company, Philadelphia; 1924.
- MCCALL, W. A. *How to Measure in Education*. Macmillan Company, New York; 1922.
- MONROE, W. S. *An Introduction to the Theory of Educational Measurements*. Houghton Mifflin Company, Boston, 1923.
- , DE VOSS, J. C., and KELLY, F. J. *Educational Tests and Measurements*. Houghton Mifflin Company, Boston, 1923.
- ORLEANS, JACOB S., and SEALY, GLENN A. *Objective Tests*. World Book Company, Yonkers-on-Hudson, New York; 1928.
- PINTNER, RUDOLF. *Intelligence Testing*. Henry Holt & Co., New York; 1923.
- PRESSEY, S. L. and L. C. *Introduction to the Use of Standard Tests*. World Book Company, Yonkers-on-Hudson, New York; 1922.
- RUCH, G. M., and STONARD, GEORGE D. *Tests and Measurements in High School Instruction*. World Book Company, Yonkers-on-Hudson, New York; 1927.

- RUSSELL, CHARLES. *Standard Tests*. Ginn & Co., New York; 1930.
- SMITH, HENRY L., and WRIGHT, W. W. *Tests and Measurements*. Silver, Burdett & Co., New York; 1928.
- STERN, WILLIAM. *Die Intelligenz der Kinder und Jugendlichen*, Fourth Edition. Barth, Leipzig; 1928.
- , and WIEGMAN, OTTO. *Methodensammlung zur Intelligenzprüfung von Kindern und Jugendlichen*. Barth, Leipzig; 1926.
- SYMONDS, P. M. *Measurement in Secondary Education*. Macmillan Company, New York; 1927.
- TERMAN, LEWIS M. *The Measurement of Intelligence*. Houghton Mifflin Company, Boston; 1916.
- *The Intelligence of School Children*. Houghton Mifflin Company, Boston; 1919.
- THORNDIKE, E. L. *The Measurement of Intelligence*. Teachers College, Columbia University, New York; 1927.
- TRABUE, MARION R. *Measuring Results in Education*. American Book Company, New York; 1924.
- Twenty-first Yearbook of the National Society for the Study of Education*. Public School Publishing Company, Bloomington, Illinois; 1922.
- WHIPPLE, G. M. *Manual of Physical and Mental Tests*. Warwick and York, Inc., Baltimore; 1914-1915.
- WILSON, G. M., and HOKE, K. J. *How to Measure*. Macmillan Company, New York; 1920.
- WOODROW, H. W. *Brightness and Dullness in Children*. J. B. Lippincott Company, Philadelphia; 1919.

An annotated list of articles on the Binet tests is contained in the *Journal of Educational Psychology*, Vol. I, No. 5 (1914), pages 215-224, 279-290, 335-346. 254 articles are listed.

The following test bibliographies and lists of test supplies are recommended:

- Bibliography of Educational Measurements*, 1927 Edition. Indiana University, Bloomington, Indiana.
- Bibliography of Educational Tests* (University of Illinois Bulletin). University of Illinois, Urbana, Illinois; July 1, 1927.
- Bibliographies of Standardized Tests*. Educational Research Division, State Department of Education, Albany, New York.
- Bibliography of Tests for Use in Schools*, Sixth Edition. World Book Company, Yonkers-on-Hudson, New York; 1924.
- Bulletins of the Public School Publishing Company, Bloomington, Illinois.
- Character and Personality Tests*. Association Press, New York.
- GAMBRILL, BESSIE L. *An Analytical List of Kindergarten-Primary Tests*. Whitlock's Book Store, New Haven.

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- MANSON, GRACE E. "Bibliography on Psychological Tests and Other Objective Measures in Industrial Personnel," in *Journal of Personnel Research*, Vol. IV, Nos. 7 and 8; November-December, 1925.
- Psychological Bulletin*, Vol. 23, No. 7 (July, 1926); Vol. 24, No. 7 (July 7, 1927); Vol. 25, No. 7 (July, 1928); Vol. 26, No. 7 (July, 1929).
- Psychological Tests* (Bulletin No. 6). Bureau of Educational Experiments, New York; 1918.
- Stoelting Catalog of Psychological and Physiological Apparatus and Supplies. C. H. Stoelting Company; Chicago.
- Test Bibliography*. Bureau of Publications, Teachers College, Columbia University, New York.
- United States Bureau of Education Bulletin, 1923, No. 55.

QUESTIONS AND TOPICS FOR FURTHER STUDY

1. A school superintendent wishes facts about the status of achievement of pupils in schools throughout the city. Recommend tests to be used.
2. How would you arrange for the administration of a testing program in a city of 25,000 population? in one of 500,000 population?
3. Outline a testing program for an elementary school enrolling 500 children, assuming that no previous testing has been done. What instructions would you give the teachers? What part shall teachers have in the program?
4. List the measurement needs of a sixth-grade classroom in which no measurement work has been done.
5. To what extent should teachers be used in the testing program? What duties should they be assigned?
6. Outline the best procedure when teachers are opposed to the introduction of measurement.
7. One parent considers objective tests of all varieties an expensive and worthless "added frill" in education. What would you say to this parent?
8. Enumerate the difficulties in the administration of group intelligence tests in the primary grades.
9. Should teachers know their pupils' IQ's? State the reason for your answer.
10. If a child at first refuses to leave his mother to go for an individual examination, what are some of the possible ways of meeting the difficulty?
11. What should the examiner do if, after giving a few of the tests of the Stanford Binet series, he discovers that the child thinks he was given the series the day before?
12. How can the psychologist meet a request to find out whether a child who came to this country from Mexico three months ago and who speaks little English can do the regular work of the fourth grade?
13. Is the Stanford Binet test applicable to a child with a foreign back-

ground? Should allowance for foreign background be made in interpreting the test results?

14. Should test results indicating pupil capacity and achievement be given to parents?

15. Compare average or median scores for a standard achievement test given to an elementary school class with the norms for the test. How do you account for discrepancies?

16. Select a school with which you are familiar, and check the efficiency of its measurement program. Write out the recommendations you would make to the authorities concerning changes to be made.

17. Choose a list of books on measurement and child study to be placed in the hands of the classroom teacher.

CHAPTER FIVE

THE EXCEPTIONAL CHILD

INDIVIDUAL DIFFERENCES IN SCHOOL CHILDREN

SCHOOL children of similar age show wide differences in rate of learning and in ability to reason, to carry out directions, to derive meanings from the printed page, to exercise foresight in the execution of a project. Differences are also apparent in inhibition, emotional stability, sociability, conscientiousness, energy, and other personality traits. There is a resemblance between the nature of the distribution of these differences and that for height, weight, and other physical characteristics in unselected groups of children. Quantitative determinations of differences in mental traits indicate distributions approximating the symmetrical, bell-shaped curve of a normal distribution. In such a distribution the greater number of the individuals measured cluster fairly closely about the central tendency of the entire group. The remainder of the group are distributed symmetrically with respect to the central tendency, with decreasing numbers of measures at greater distances from the center of the distribution. The farther an individual stands from the center of the group, the more exceptional he is.

The range in capacity or achievement in large groups of children has been determined through extensive experimentation. For example, in arithmetic computation some children can accomplish within the same time allowance much more than can others of the same age or grade group.¹ A two-to-one ratio is found for a number of mental traits and accomplishments when measures of the best and poorest of 99 per cent of the individuals composing the group are com-

¹ See Cyril Burt: "The Distribution and Relations of Educational Abilities," in the *Report of the London County Council, No. 1868*. London; 1917.

pared. A small proportion of those rating highest and lowest in the group constitute the extreme deviates. An individual who deviates in one trait or capacity need not necessarily deviate to the same degree in other traits. The extent of deviation varies from trait to trait.

With respect to learning children differ primarily in (1) method of learning and (2) time required to learn.

TYPES OF EXCEPTIONAL CHILDREN

Gesell (219) defines the exceptional child as "one whose mental and physical personality deviates so markedly from the average standard as to cause a special status to arise with respect to his educational treatment and outlook." In educational institutions such children may be those who learn rapidly or slowly, those who have difficulty making social adjustments, those suffering from sensory defects, or those showing tendencies toward delinquency or otherwise exhibiting maladapted behavior.

The exceptional child in an educational sense is therefore one who not only deviates widely from the group but whose deviation requires special attention from an educational point of view. Some deviates are obviously more problematical than others. The deviate need not necessarily be a problem child.

Van Sickle (263) reports one of the earliest efforts to classify and provide for exceptional children in the public schools. His committee listed as exceptional children: (1) the physically exceptional; (2) the intellectually exceptional, including the mentally defective, the backward, the very capable; (3) the morally exceptional — truant and refractory pupils.

In all attempts at classification of exceptional children considerable overlapping in the different groups is to be expected. Individual children may belong to several types at once. Physical and mental characteristics are so inextric-

cably linked together that it is frequently impossible to tell whether the difficulty is primarily physical or mental. There is also a close association between mental development and the ability to distinguish between right and wrong. In consequence both mental and "moral" imbecility may be found in one individual. Beyond a certain point classification of deviates is not especially useful. The gradual shading of one type into another — the lack of sharp demarcation between different classes or types — makes hard and fast classification impossible.

The major types of deviates for whom psychological service is necessary are three:

1. Deviates classified on the basis of learning capacity — the subnormal, the gifted, and individuals with special talents, capacities, and defects.
2. Behavior deviates — the nervous, psychopathic, or unstable child, the truant, the delinquent, the anti-social, and speech defectives.
3. Physically exceptional pupils in whom the physical defect causes psychological problems — pupils with sensory defects, physical deformities, toxic conditions, endocrine imbalance, epilepsy, paralysis.

These three classifications overlap. Many exceptional children belong to all groups.

CHARACTERISTICS OF EXCEPTIONAL CHILDREN

The mentally subnormal child. The retarded, defective, potentially feeble-minded child and the problems he presents were subjects of study for a long period before the application of psychological measurement. With the use of measurement many misconceptions concerning the subnormal child have been removed and the characteristics and educational needs of such children have been studied.

Observations and scientific studies of subnormal children have been made by many psychologists, among whom are Goddard, Huey, Norsworthy, Kuhlmann, Hollingworth, Inskip, Wallin, and Doll. As a result of these observations the following facts have been ascertained :

1. In the public schools the subnormal child is ordinarily a retarded child. He is unable to make progress in school at the rate of one ordinary school grade a year. The more serious his deficiency, the more retarded he is likely to become after having spent a number of years in school.
2. The subnormal child does not learn to read at a normal rate, and he has more difficulty than the average child with the reasoning processes in arithmetic. He has difficulty in comprehending and using meanings and in dealing with abstractions.
3. The duller the child, the more likely he is to play truant if he is forced to attend the regular classes in the public schools. The cause of absence from school is to be found not in the excuse often given, that the child's help is needed in the home, but in the fact that the child must meet competition with normal children in schools, which he wishes to escape.
4. Dull or borderline cases show more tendency toward delinquency than do normal children, since they are often unable to inhibit wrong tendencies and to discriminate between right and wrong. Furthermore, delinquencies provide outlets which are satisfying to the child and furnish a mode of compensation for his failures in the classroom. The home background of such children is usually, though not always, inferior to that of the brighter child.
5. The dull child exercises less foresight than does the normal and bright child. It is more difficult for him

to anticipate events, to plan for the future, to sacrifice present pleasure for future good.

6. The duller child is less autocritical, less able to profit from his mistakes; his behavior tends to be stereotyped; he is unable to adjust readily to new or problem situations; his habits are less easily modifiable.
7. The developmental history of the defective child often shows retardation in learning to talk, walk, acquire nursery tricks, control elimination. Speech development is slow. Deficiency in motor control is evident and is slowly, if ever, overcome.
8. As compared with normal children of the same age, the vocabulary is limited, the articulation poor, the sentence structure infantile.
9. The child has short attention span, defective judgment, and limited knowledge of the world about him.
10. The subnormal child tends to be apathetic, lacking in aggressiveness, overdependent on adult assistance, not playful, versatile, resourceful, or creative.
11. He deals with concrete experiences more satisfactorily than with abstractions.

There is probably no more frequently misunderstood child than the "dull normal." If he is sociable, good looking, affable, well dressed, and from a good family, the difficulty is complicated tenfold. His poor achievement is usually attributed to lack of effort, extraneous interests, and a hundred other irrelevant or indirect causal factors. Other types of mildly exceptional problems are similarly misinterpreted. All such cases need proper understanding and suitable training if they are to be successes rather than failures.

Louis. The case of Louis is illustrative of serious mental retardation in a young child. At the age of five the boy was brought by his mother to a psychologist for study. The

mother hoped to remove the child's backwardness by placing him in a good school under the care of well-trained teachers. Louis was in good physical condition, having had the care of specialists since infancy. There was marked facial asymmetry and an expression of vacuity which was relieved occasionally by an awkward grin. The child was unable to respond to such questions as "How old are you?" and "Where do you live?" which the average five-year-old can answer readily as soon as he becomes friendly with the examiner. In going downstairs Louis clung tightly to his mother and the stair rail, placing both feet on each step before proceeding to the next, in the fashion of a two- or three-year-old. The child had first begun to speak only a year before, but walking and control of elimination had been established somewhat earlier. He had learned to feed himself but was unable to assist in his dressing. All his responses to the examiner's questions were expressed in single words. He replied, "Ki-Ki," for "custard," when asked what he liked for dinner. He named a few of his toys in indistinct syllables and mentioned the name of one of his playmates, but he was unable to make even a simple statement about his experiences in the form of a complete sentence. The mother reported that he appeared to enjoy the movies and baseball games. After one game he repeated many times an imitation of a player at the bat. The child has little companionship besides that of his mother because children of his age tease him and refuse to play with him. He shows the characteristic negativism and short attention span of a three-year-old child, and in consequence his behavior is very difficult to control.

The boy was given the lower levels of the Binet test, but his inability to comprehend and to respond intelligibly prevented him from having much success with the tests. He was unable to copy a square but could imitate the exam-

iner's drawing of a circle. He was able to point to eyes, nose, mouth, hair, and to repeat, "I have a little dog," though his enunciation was very indistinct; to say whether he was a boy or girl; to give his name, though indistinctly. In reply to, "What do you do when you are sleepy?" he said, "Bed," to "What do you do when you are cold?" "Cough," and to, "What do you do when you are hungry?" "Supper." This was the only test passed at the four-year level. He was unable to name three common objects — a three-year test — to choose the longer of two lines, to discriminate forms, to repeat four numbers, or to count four pennies — all tests of the four-year level. The resulting IQ was 57.

The home background is average; there is no foreign language problem; and the child's opportunity for learning has been equal to that of the average child.

The gifted child. The characteristics of the gifted child as determined by experiment show in many respects the marked superiority of such children to the normal and sub-normal. The chief contributions to our knowledge of the gifted child have been made by Terman and his collaborators (255), and by Leta S. Hollingworth (227). Similar results have been obtained by both investigators. In most traits the gifted have been found to be the antithesis of the sub-normal. Only a brief outline of the most significant facts discovered can be presented here:

1. Gifted children are found to be superior to average children in height and weight.
2. They learn to walk and talk earlier than do normal children.
3. The superiority of the gifted over the average in all fields of accomplishment is marked. In general information, reading, language usage, the difference is greatest.

4. Gifted children are on the average not more likely to be queer, nervous, or erratic than are average children.
5. Gifted children are more mature in their interests than are average children and are also more interested in literature and dramatics and in intellectual games.
6. Gifted children are superior to average children when tested for honesty and trustworthiness. The gifted child of nine has a degree of moral development more like that of a child of fourteen.
7. Gifted children, according to Hollingworth (379), are usually youngest in their classes though still much below the point where they could function readily in the ordinary school. They learn very easily and when they are segregated in special classes progress far more rapidly than do average children. As a group they are large and strong for their age and are superior in character and temperament.
8. They do not tend to become mediocre, as has been popularly supposed, but maintain their superior status as they develop.
9. The majority of gifted children originate in families where the fathers are professional men, clerical workers, or business executives.
10. They have more distinguished persons among their relatives than have average children.
11. An interesting characterization of the gifted child, made by Hollingworth, is that the gifted child "knows more than he can do." The fact that bright children do not always succeed in school work need not necessarily be a criticism of bright children. It is usually a sign that the bright child is misunderstood and improperly treated.
12. Bright children usually need less drill, routine, repeti-

tion, than the average child, and will suffer under too much enforced discipline.

13. The bright child usually makes better use of freedom to pursue his own interests than does the duller child. (The caution should be added that mere brightness of itself does not insure superior characteristics. It makes development easier, if the proper guidance is provided and adequate control exerted.)
14. Some specialists who have made intensive study of gifted children are of the opinion that the gifted child should specialize much later than the dull, since his possibilities for successful achievement in a wide variety of fields is greater.

The fact is usually lost sight of that unusual superiority is just as exceptional as unusual inferiority. The average teacher is seldom conscious of this fact. Gifted children have as many exceptional characteristics as mentally deficient children, but for many reasons the ordinary observer is not cognizant of this fact. Gifted children also vary greatly among themselves in capacity, achievement, behavior, and the extent to which they utilize their talents.

The consensus of opinion among psychologists is that bright and dull children differ in degree rather than in kind and that the differences are quantitative rather than qualitative. The dull child shows low potentiality and slow development; the bright child, high potentiality and acceleration in mental development. The dull child reaches his ultimate limit of development somewhat earlier than the bright child, having a shorter road to travel to the limit of his mental maturity.

Herman. At the age of seven, after a few months in school, Herman's achievement convinced the faculty that he was ready for the third or fourth grade. He had shown unusual eagerness for knowledge from babyhood and the result was

a large store of incidental learning comparable to that of an eight- or nine-year-old child. The school psychologist, without being told any of the facts in the case except the child's age, was asked to determine the most suitable grade placement for the child. The boy was given several standard tests, including the Stanford Binet examination, and was asked many questions concerning his interests and background. The statement that the resulting IQ on the Binet test was 154 gives little indication of the general superiority of the boy's comprehension and reasoning ability, and his facility with language. The child's responses were replete with witty sallies and shrewd analyses. He proved to be the most charming, the most genuinely responsive, and one of the most interesting children the examiner had worked with in the course of examining some three thousand school children. All the tests of the eight-year level were passed, three of the nine-year, one of the ten-year level, three of the twelve-year, and one of the fourteen-year level of the Stanford Binet series—distinguishing “between president and king.”

At the time of the examination and interview the child had good command of the English language, as well as of German, classical Hebrew, and Yiddish. His definitions of words in the Binet vocabulary test were occasionally equal in quality to those of adults. His family are cultured but in moderate circumstances. The boy has had close companionship with his parents, but almost no formal training of any sort. At the time of the examination he was large for his age and, except for a baby roundness in his face and limbs, might easily have been mistaken for a boy two or three years older. Motor control was unusually mature. The child showed a serious attitude toward responsibility all out of proportion to his chronological age. He had taken upon himself the task of getting the family up every morning at

seven to attend services in the synagogue. His plans were already made to become a rabbi. It was recommended in view of his unusual physical and mental maturity and satisfactory adjustment that he be allowed to progress in school just as fast as his development required.

The child was placed in the fourth grade, where he soon became at home and progressed satisfactorily. He has been less difficult to control than many of the older children and is far more satisfying to work with than a number of other pupils in his class. He has never appeared to be out of place with the older children even though they as a group are brighter than average children of their age.

SPECIAL TALENTS AND DEFECTS

Although a positive correlation is usually found among the traits of any individual child, not every gifted child is equally gifted in all traits. Although it has been said that a first-rate poet would make a better ship's captain than the average seaman, and a ship's captain would make a better poet than a person of ordinary linguistic ability, there are many exceptions to the rule. Some children of average ability show unusual superiority in special capacities such as creative ability in the fine or manual arts, social maturity, or linguistic ability. Other children of normal ability with respect to most traits show marked deficiencies in other traits. A few children have been known to be subnormal mentally but relatively gifted in artistic techniques or mechanical ability. A part of this unevenness in traits and capacities may be ascribed to native defect or superiority. Some of it is attributable to strong interests or aversions exhibited by the child's associates or brought about by other environmental influences. These individual idiosyncrasies have significance for education. In the conservation of talent or the early recognition of defects lies the hope

of individual happiness and achievement. The nature of special abilities and defects has been investigated and reported by Hollingworth (229) and Bronner (201).

A discussion of pupils who are in need of diagnostic and remedial work in the school subjects is given in Chapter VII.

BEHAVIOR AND ADJUSTMENT PROBLEMS

Schools enroll another group of exceptional children, generally referred to as "behavior problems," who, though neither dull, physically defective, nor below par in sensory acuity are nevertheless exceptional and problematical from the standpoint of conduct. These are often children in whom no physical or mental deficiency constitutes the source of the difficulty. Emotional factors, unfavorable environmental conditions, are often prepotent in causing the difficulty. There are several distinguishable groups of such children:

1. There are those who retain infantile habits and attitudes after reaching school age, are overdependent upon adults and older siblings, indulge excessively in temper tantrums, have night terrors and enuresis, or poor control of elimination, of psychological origin.
2. "Nervous children." Those who have nervous tics, chorea of psychological origin, hysteria, or speech defects complicated by emotional disturbance; those who are too easily excitable, tense, worried, under constant strain, have unusual or irrational fears, are unduly shy, too easily embarrassed or angered.
3. Children who are unsociable, lack poise proportionate to their age, or are unhappy, secretive, evasive, or repressed.
4. Those who show unusual cruelty to pets and comrades, who play truant, are deceitful or incorrigible, are sexually perverted, or who show other tendencies toward delinquency.

5. One group of poorly adjusted school children is composed of those in whom a compensatory and escape mechanism is operative. What such children lack in one direction — personal appeal, approval of classmates, and the like — is made up through daydreams, truancy, overstudiousness, overconscientiousness, fixations on teachers or classmates. To a limited degree these mechanisms are employed by normal people. When they take the place of all normal and rational association, activity, intercourse, so as to cripple the individual's achievement, with resulting inefficiency, the result is characterized as maladjustment.

Types of poorly adjusted individuals have been described by Gates (369). Although his reference is primarily to adjustment problems in the adult, most of the poor adjustment described is to be found in incipient stages in school children. Gates lists as types of introversion the "suffering hero," the "conquering hero," and cases in which the individual identifies himself with another real or imaginary individual. He also describes the "sour grapes" type and those who resort to the mechanism of rationalization as a means of evasion or escape from reality.

The difficulties of behavior deviates are not always diagnosed in the same way by different specialists. The seriousness of the problem differs in the case of individual children. Few standards have been set up by which to judge the extent of the young child's deviation with respect to social and moral conduct.

Some of the most common causes of emotional disturbance in children mentioned by Healy (224) include the child's doubt about his parents, the child's discovery that persons he has trusted have deceived him, sex, harsh treatment given to sensitive children, loneliness, speech defects, deformities.

Mateer (239) lists ten points which she considers, as a

result of her experience, important in the study of psychopathic cases. These are:¹

1. Range above basal year on Stanford Binet.
2. Distribution of responses on the Stanford Binet. Success in rote memory, constructive and free association, reasoning, and comprehension.
3. Quality of individual test responses on the Stanford Binet. Responses unusual, individual, or normal.
4. Kent-Rosanoff Association Test. Number of common and individual responses.
5. Kent-Rosanoff Association Test. Quality of response.
6. Balance on performance tests.
7. Orientation.
8. Success in school work in proportion to capacity.
9. Incoherence, ambiguity, circumstantiality, in own story.
10. Behavior during the examination. The factors to be evaluated are extreme lack of adaptation, extreme apathy or excitability, negativism, automatisms, and the like.

The validity of these ten points in diagnosing psychopathy has not been completely established, nor has the extent to which normal and psychopathic individuals overlap with respect to these characteristics been fully determined. Others working with the Binet tests do not, for example, find that "scattering" above the basal age is an indication of psychopathy.

The difference in point of view lies in the complete lack of agreement as to standard criteria for judging the presence or absence of psychopathy in the individual. Mateer believes that the determination of such a criterion is a necessity if the study of psychopathic individuals is to become scientific.

¹ Adapted from Mateer's *The Unstable Child*, pages 170-192. Used by permission of D. Appleton & Co., publishers.

ILLUSTRATIONS OF PROBLEM PUPILS

There is the case of B., a boy of six in the first grade with high mental capacity as determined from test results, who does not know how to play with other children, refuses to coöperate with teachers, is bossy, dictatorial, constantly interrupts any serious activity in progress, demands undeserved recognition, and after a year of schooling has made no appreciable progress in the mastery of skills or techniques because of his persistent refusal to give attention during instruction periods. The child is in perfect physical condition as far as physicians are able to determine.

Another child, a girl of seven, kicks and bites anyone whom she dislikes, screams and cries when the mental examiner enters the room, though her ability and achievement are superior, judged from test results. She demands to be taken home at the slightest provocation, and is strained, worried, and irrationally fearful under circumstances not ordinarily exciting to normal children.

B., a girl of twelve in the sixth grade, with mental ability as determined by tests only slightly below the average of her group, has occasional fits which resemble epilepsy, though no physical basis can be discovered for the difficulty. When transferred to a special school enrolling only girls devoting most of their time to household arts, she experiences no recurrence of difficulty. When, after a period of evident improvement, she is again transferred to an academic high school enrolling both boys and girls, the difficulty recurs.

R., though in good health and apparently normal otherwise, vomits before school every morning for a week at a time. On Saturdays and Sundays his behavior is entirely normal.

G., a boy of high intelligence in a public school, fails in English because he refuses or appears to refuse to master the mechanics of composition sufficiently to meet the stand-

ards of the school for his grade. He reads adult literature, and the quality of his writing is on an adult level. He brings rare passages of Chinese poetry to the attention of his English teacher. The teachers, however, regard him as quite dull. The boy considers the dog superior to human beings for companionship. He has no friends besides his dog and sometimes wishes he were dead.

A second-grade boy of more than average ability resorts to subterfuges and alibis. One day he developed a fit of coughing for which the teacher permitted him to leave the room. His cough subsided when the school physician confronted him with his deception after finding no physical basis for the difficulty. Other types of evasions followed one another in quick succession. Through them the child was always able to avoid unwelcome responsibility.

Close observation of the child is in many cases necessary to distinguish between behavior indicative of a temporary and transitory phase of the child's development and behavior which characterizes the child as habitually maladjusted.

DIFFICULTIES DUE TO PHYSICAL HANDICAPS

There are many other causes of malfunctioning in school children in which the situation is complicated by physical deficiency or sensory defects. Physical disorders have a close association with mental abnormalities in children. Thyroid deficiency, for example, is closely associated with a picture of slowness, dullness, and emotional apathy, just as thyroid oversufficiency is related to exaggerated emotional responses, nervousness, and irritability. The endocrine balance is closely associated with temperament. Scientists are discovering that a close relation also exists between nutritional factors and emotional stability.

Physical defects are very likely to cause a compensatory mechanism to operate. Slight mental deficiency, not

actual defectiveness, may cause the same result. Physical defects also frequently result in inferiority complexes. Hence, as Groves suggests, the physically handicapped child needs to develop, from his earliest years, healthy attitudes toward life. Adler, in the *Neurotic Constitution*, describes in detail the relation of bodily defect to unbalanced mental states.

The problem of the overweight child has also been investigated from the standpoint of mental disturbance and attendant feelings of chagrin or inferiority.

An illustration is that of F., a child in a public school who is considerably overweight for his age and height. The child has an enormous appetite and is constantly munching candy. In the classroom the other boys consider him a sissy and refuse to choose him for their teams because of his awkwardness. In consequence the boy loathes the gymnasium period. Tests show him to be of normal intelligence. His classmates tease him continually. At times he storms with rage and has fits of crying due to his anguish and despondency. At such times he runs home from school if he can get away without being caught. He has an older brother in high school who is normal in every respect and has shown none of the behavior characteristics of his younger brother. In this case social readjustment cannot be expected until the child's physical handicap is removed.

SPEECH DEFECTIVES

Speech defects are common in the early school years, and in a small percentage of cases, persist as the child matures. The defects commonly found in the primary grades may be simply evidences of immaturity. Speech defects which persist may be evidences of incorrect habit formation, emotional instability, or abnormality. They are of two general types: those having a physical basis primarily—for example, deformed palate, crooked or missing teeth, enlarged

tonsils, or adenoids; and those in which the cause is chiefly psychological, the difficulty being due to faulty learning, or inhibitions, fears, conflicts, strain, or fatigue. The difficulty may be due to a combination of physical and psychological causes. Children with speech defects may otherwise be perfectly normal. Speech defects of psychological origin are of two types: defective articulation and stuttering.

Among the most clearly distinguishable types of speech defects are lisping, baby talk, clattering, and stuttering, or stammering. Some of these defects are temporary stages in the development of correct speech habits. This is true of baby talk, which can be explained as a lack of maturity in the perception of sounds, and imperfect articulation due to immaturity in neuro-muscular coördinations. Lispings of psychological origin indicates that the child has not distinguished sounds correctly or has not hit upon the right combination of lips, teeth, and tongue to produce the sounds correctly.

Stuttering, or stammering, constitutes the most serious and troublesome speech disorder of all the types of speech defects. Such a disorder indicates the formation of faulty habits of muscular coördination, resulting in incorrect breathing and consequent hesitant speech. The two distinguishing characteristics of stuttering as contrasted with clattering and other forms of hesitant speech are cramps in the muscles involved in speech and resulting inability to articulate sounds. The stuttering usually begins in early childhood between the ages of two and seven. Stuttering does not develop suddenly, as is commonly supposed, but almost invariably has a long and insidious career. The first observable signs are gasping breath and inability to phonate, usually shown when the child is excited or fatigued. Undue restraint, pressure, or conflict in these early years may be the basis of the difficulty. In the case of one child the acquisition of a street-

corner vocabulary, the use of which was barred at home, appeared to be the source of the difficulty.

It was formerly thought that all cases of stuttering were due to emotional disturbances of some kind, particularly to the fear of meeting certain situations, and that the correction of the speech defect lay in the improvement of emotional adjustment. As the result of a controlled experiment, McDowell (241) found no difference in the emotional disturbances and characteristics of a group of stuttering children chosen from a large public school population and those of a group of children with normal speech chosen from the same population. This does not preclude the possibility that many cases of stuttering are nevertheless complicated by emotional disturbances and conflict. From one point of view stutterers are deviates in learning to speak, corresponding to individuals who deviate in the learning of any other complicated or intricate skill.

THE PROBLEM OF READJUSTMENT

We may expect to find children with all degrees of intelligence showing variations in the normality of their adjustments to the situations which daily confront them. The feeble-minded, the average child, and the intellectually gifted may all show variations in adjustment corresponding to their ability to make adjustments. It is certain that success in adjustment will depend to a large extent upon the situations in which the individual is placed. Pupils of average ability and opportunity who fail to make normal adjustments or to make progress commensurate with their intelligence and opportunities constitute "problem" cases. Whether the deviate becomes a problem child will usually depend upon conditioning circumstances.

A complete study of the child's background, school history, health, attitudes, and desires is necessary if proper diagnosis

is to be made and a program of reëducation undertaken. It is evident that neurotic and psychopathic children require more intensive study than other types of exceptional children if the problems that they present are to be solved. Their difficulties are elusive and complicated, and their behavior often extremely variable from day to day. Individual differences in temperament, aptitudes, background, make individualization of readjustment programs mandatory. A program suited to one child may fail lamentably with another. Ready-made programs are seldom satisfactory for this reason. The major problem in all cases is one of retraining adapted to the special needs of each child.

METHODS OF DETECTING EXCEPTIONAL CHILDREN

The most extreme variants among school pupils are usually self-evident. Thus the imbecile, the genius, the child with a court record, the totally blind or deaf child, is at once recognized as being exceptional and in need of educational provisions adapted to his needs. The less extreme deviate, on the other hand, is usually not discovered by such ordinary observation methods as the teacher employs. The moron or the unstable child may for a long period of time escape detection. Even though the ordinary observer is vaguely conscious that the child is "difficult," he is usually unable to determine the true nature of the difficulty or to assign to it the proper causes. The identification of less extreme deviates usually requires the services of an expert.

Various methods are used for detecting exceptional children, all of which may be used simultaneously to good advantage and are essential for a thorough investigation. These methods include :

1. Questionnaires filled out by teachers and administrators.
2. Examination of pupils.

3. Interviews and conferences with parents and pupils.
4. Observation of the individual's behavior in ordinary situations.

A description of the methods used by the psycho-educational clinic of the St. Louis school system in detecting feeble-minded pupils has been given by Wallin (35). In his description he lists the various types of information obtained for each child before a final verdict was given and the pupils assigned to special classes.

Gesell (219) describes the method used for selecting exceptional pupils in the schools of New Haven and presents the criteria which in his opinion are essential in the selection of exceptional pupils who need special educational provisions. The 24,000 school children of New Haven were surveyed in order to locate the exceptional children enrolled. Four blank forms were filled out by teachers. Form A was used for listing children suspected of being mentally deficient. On Form B the teacher gave information relating to pupils belonging to any of the following classes: the partially deaf, the partially blind, speech defectives, the epileptic, the delinquent, extremely nervous children, those physically inferior, the exceptionally talented. Form B also called for certain identification data for each child listed. The question was asked, "Is the child so much out of place in your room that he should be sent to a special class?" Estimates of the child's capacity in school subjects were requested, together with questions on play and personal traits. Form C contained questions calling for information about the home and the school. Form D was designed for simple tests of writing and drawing by children suspected of being mentally deficient. Another form, E, contained a simple arithmetic test. A set of four additional blanks containing an abbreviated version of the Binet scale was used with each child suspected of being mentally deficient.

As a result of this survey an educational policy with respect to the exceptional children was formulated. Special educational provisions were made for the superior pupils, the delinquents, those physically inferior, and the speech defectives.

The teachers of a private school were asked to assist in the detection of problem pupils in a recent survey (225). The teachers were given blanks for recording data, together with a statement of some of the types of difficulties for which to look and the general characteristics of problem pupils. The list of traits given the teachers is as follows:

1. Deficiencies in school subject achievement in comparison with ability, deficiencies in study habits, general immaturity, poor mentality.
2. Unfavorable home conditions, the parent constituting a major part of the problem.
3. Nervousness; irritability; abnormal shyness, erratic, peculiar behavior; irrational fears, cases of stammering or stuttering.
4. Bad habits; wrong attitudes; cases of badly spoiled, dependent children; laziness; inattention; evasion of responsibilities.
5. Antisocial behavior, pre-delinquent tendencies, discipline problems, cases of poor social adjustment.
6. Poor physical condition — physical handicaps which may interfere with school work.

The questionnaire asked for the following information:

1. Why do you consider this child a problem?
2. Have you discussed the difficulty with parents, teachers, administrators, physicians, psychologists? . . . When did the discussion take place?
3. Were recommendations made? What were they?
4. Were recommendations carried out? What was done?
5. Do you think a conference with everyone concerned in the case is desirable?
6. Do you feel that you already have the case well in hand, or that you have found the difficulty and can remedy it yourself?

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7. Have you suggestions to make that would be helpful in dealing with the problem? What are they?
8. Additional remarks:

Such information obtained from the teacher with reference to individual pupils was used in improving adjustments and carrying on diagnostic and remedial work.

One educator (#66) has made a study of the ability of teachers to select bright and dull pupils. He attempted to discover whether or not it becomes more difficult to select bright and dull pupils as they grow older. The conclusions reached are that teachers can select 20 to 40 per cent of the bright pupils in their grades and 50 to 60 per cent of the dull; it is, for many reasons, more difficult to select the bright than the dull; and it appears to be less difficult to select the bright and dull as they grow older.

Pupils whom the teacher is likely to recommend for individual study are the dull, the behavior problems, children with physical defects, and those with disabilities in the school subjects. The gifted will not usually be recommended unless they constitute behavior or scholarship problems.

THE USE OF TESTS IN THE DETECTION OF EXCEPTIONAL PUPILS

Intelligence tests are helpful in the selection of bright and dull children in the schools, but they should not constitute the sole criterion of superiority or deficiency. The placement of pupils in special classes entirely on the basis of IQ's determined from single tests, unaccompanied by other data, is to be deplored. Where such a procedure is followed, grave injustice in individual cases may result.

The most common procedure in the utilization of tests in the selection of bright and dull pupils is somewhat as follows: As the result of general surveys of the mental ability and educational achievement of pupils in the school system, those

whose scores place them in the lower and upper deciles of the group, allowance for differences in chronological age having been made, are selected for retesting and further observation. In the reexaminations individual tests of various types are given to provide a more complete picture of the child's performance. Along with the intensive examination of the child goes the investigation of all other factors which are necessary for the final diagnosis of the case. If no general survey of intelligence and achievement has been made but the presence of exceptional children in the schools is recognized, teachers usually recommend to the psychologist the best three or four children and the most difficult three or four children in the class. The psychologist by checking up on chronological ages can quickly eliminate children who have been obviously misjudged and can concentrate upon the intensive testing and study of the remaining children who have been recommended for investigation.

EDUCATIONAL PROVISIONS FOR EXCEPTIONAL CHILDREN

"Schools cannot equalize children, schools can only equalize opportunity," asserts Hollingworth, expressing an opinion reached after years of study of individual differences in school children. Equalizing opportunity means, not providing equal amounts of similar opportunity, but providing opportunity in accord with pupil needs.

After many years of study educators and psychologists have found that marked differences in children cannot be eliminated but rather are likely to be exaggerated by training. It is consequently futile and may even prove harmful to attempt the elimination of individual differences among children by giving the same educational treatment to all. It is equally true that suitable educational provision for the exceptional child through proper grade placement and classification, the organization of special classes, and curricu-

lum adjustment tends to eradicate maladjustment. Arbitrary standards of achievement set up without regard to the exceptional child's capacities and developmental status have usually been harmful. Standards commensurate with the child's abilities and opportunities are more satisfactory. There is no exceptional child in the public schools who cannot learn, develop, become better adjusted, and improve, provided his needs, limitations, and gifts have been discovered and understood and suitable educational provisions have been made for him.

These facts do not imply a need for differentiation in educational aims as contrasted with the educational aims proposed for the education of normal children. The aims are the same. Differentiation in educational treatment is necessary for the realization of the aims proposed.

For the educational adjustment of the exceptional children the following plans have been suggested :

1. An individual scheme of instruction such as the Dalton or Winnetka plans for all grades of individual differences.
2. Segregation of exceptional children in special classes.
3. Rapid advancement or curriculum enrichment for the gifted.
4. A free scheme of education utilizing units of work, or centers of interest.

Each of these schemes has ardent adherents. All of them have desirable features which contribute to the educational advancement of the exceptional child.

SPECIAL EDUCATIONAL PROVISIONS FOR SUBNORMAL CHILDREN

Retardation of the dull child cannot be considered the most adequate treatment for him. The best educational provision for dull and feeble-minded children is obtained

through providing a differentiated curriculum for them. The need for segregation or classification is accordingly apparent. The question as to whether curriculum adjustment should be provided for all types and degrees of subnormality can only be decided by educational experimenters after more extensive research with dull and subnormal children. The evidence available at present, coupled with the opinions of teachers and experts, seems to indicate that such differentiation is the only successful educational provision for dull children. When mentally deficient children have not been forced to meet standards set for normal children, they have been known to remain in school to a later age than they otherwise would, to acquire ability to meet life situations outside of school, and to progress with feelings of satisfaction due to successful accomplishment instead of leaving in dismay at failure or discouragement over inability to cope with situations beyond their grasp.

Suitable educational treatment for the potentially feeble-minded child implies the need for the determination of the degree of mental defect in the individual. Usually the dull child can work at about the level indicated by his mental age, but his rate of progress will be somewhat in proportion to his ability if he is doing all of which he is capable. The quality of his work will in most respects be somewhat inferior to that of the normal child of the same mental age.

The criteria for placing a child in a special class for mentally subnormal children will depend somewhat on conditions and facilities at hand. If there are few special classes and many children to be accommodated, only the more serious cases of defect can be segregated. In some school systems accommodations are provided for all children with IQ's below 70 or for pupils who are mentally retarded more than three years at the age of twelve or more than two years at the age of eight or nine, who have school records

showing much grade repetition for causes other than illness, who have obtained low school marks, and whose general information and orientation are inferior.

The educational law of the state of New York requires that the boards of education of each city or school district ascertain the number of children in the schools who are three or more years retarded in mental development. In any city or district where there are as many as ten such children, special classes, each enrolling not more than fifteen such children, are to be organized. W. W. Coxe, Chief of the Educational Measurements Bureau of the University of the State of New York, has prepared a bulletin¹ in which are given recommendations for the selection of children for special classes, following the general practice of the State Department of Education. A preliminary listing of children who are retarded can be made by consulting an age-grade table. Group intelligence tests are recommended as one basis for the selection of children in need of special class instruction. Coxe recommends that children with intelligence quotients above 80 should not be placed in special classes, nor should children who are doing satisfactory work in the fifth or higher grades. Children with mental ages below five years are not considered suitable candidates for special classes, and children with mental ages above ten years should not be given the same treatment provided for special-class pupils. Children thirteen years of age or younger whose intelligence quotients are 50 or less should not be assigned to special classes, and in the opinion of Coxe it is usually inadvisable to assign pupils more than fifteen years of age to special classes since they require different treatment than younger pupils and will remain in school too

¹ Warren W. Coxe, *Organization of Special Classes for Subnormal Children* (University of the State of New York Bulletin, No. 819). The University of the State of New York Press, Albany, New York; 1925.

short a time to make their assignment to special classes worth while. The parents of retarded children should never be told that the class is being organized for dull or defective children, but that the school is attempting to make better provisions for children through organizing smaller classes with better teachers who can give children all the help they need.

As Wallin points out, state laws limiting admission to special classes to children three years mentally retarded is a very grave error, for by that time it may be too late to do anything really constructive in establishing habits and attitudes in the child. The work in the special classes should be constructive and preventive rather than reformatory.

The terms "special education" and "special class" seem to the progressive educator rather unfortunate. The proper education of the feeble-minded is no more "special" than is the education of any other type of child. The education of exceptional children need not be considered from any point of view special or unusual. No matter how far the education of the feeble-minded or otherwise exceptional child departs from tradition, it may properly be considered normal for him.

Occasionally the school finds it necessary to decide whether certain pupils would not be better off in institutions for the feeble-minded rather than in special classes in the public schools. Many of the potential institutional cases do not appear in the schools. When they do, some of the points of identification are as follows: IQ is below 40; the child is unable to take care of himself without undue attention; his mental level at ten or twelve is lower than that of the average kindergarten child; he shows symptoms of quarrelsomeness, general immaturity, and little or no school achievement, in spite of excessive overageness.

Fernald (216) suggested as a program for the training of

potentially feeble-minded children in the public schools the following points: (1) the early recognition of defectives; (2) education suited to the capacities and needs of the child; (3) long-continued industrial and vocational training; (4) social service during the school life of the child.

Too little attention, he believed, was given to habit training and to industrial training having practical significance.

Some of the most progressive work now being carried on in the field of education is that done in special classes. The usual scheme of education as planned for average children has been so glaringly unsuited to the needs of exceptional children that the curriculum makers working on the problem of the exceptional child have completely broken away from the old order of things and have revolutionized instruction for the exceptional child. The utilization of centers of interest in the reorganization of the curriculum for mental defectives was suggested by Witmer (276) in 1911. As soon as it was recognized that the dull child was not a normal child who for some obscure reason had got behind in his classes, real progress began. The radical introduction of a load of bricks in the classroom to provide suitable material for feeble-minded boys and the instruction of subnormal girls in housework in practical situations inaugurated the real education of the subnormal child.

There is some doubt as to the proper time for beginning the formal school training of the subnormal child. Some educators contend that dull children should not be admitted to school until they reach a mental age of six. In schools in which there are no special classes this attitude may be justifiable. If the child's only alternative is to enter the ordinary classroom, he might be better off at home. Where special classes are provided, it is important that the child enter school as early as possible, proper consideration being given to all the factors involved.

SPECIAL EDUCATIONAL PROVISIONS FOR GIFTED CHILDREN

With the publication of Ayres' *Laggards in Our Schools* educators realized that the greatest waste in education was the comparatively slow progress of the gifted child. Standardized tests helped to identify those children of whom too little scholastic achievement was usually expected.

Suggestions for better educational provision for the gifted include variation in rate of progress, variation in the content of the curriculum as compared with that for normal children, variation in the educational methods and techniques used.

Whether gifted children should be segregated and classified in homogeneous groups is a much-debated question. Some of the chief objections to classification are that the children tend to become conceited, they progress at a rate which graduates them from school at too early an age, their influence is needed in the regular classroom to stimulate the duller pupils, and adequate provision can be made for their educational needs in the regular classroom. Since they are seldom troublesome, as is the case with duller children, no need for segregating them may be felt.

Experience has shown, however, that gifted children are less likely to become conceited when they have to meet the competition of their equals, that to withhold a child from promotion when the child is ready for it is unfair to him, that the influence of the very bright child in the regular classroom is usually more discouraging to the duller child than it is encouraging, and that adequate provision for the needs of the superior child can seldom be made in the regular classroom where instruction is suited to the average child.

A recent study at Harvard University indicates that the younger gifted undergraduates are more satisfactory students than are older students of less ability. They get into less trouble and are more interested in intellectual pursuits.

Suggestions for the educational treatment of the gifted

child most frequently include rapid advancement and enrichment of the curriculum, or both. It should be pointed out, however, that if the child is only given more of the same things that he has been doing the curriculum has not been enriched for him; his work has only been repeated. Little educational advantage is derived by the gifted from mere repetition. Bright children require less repetition than do average children. Enrichment, to be educationally profitable, must provide subject matter on an increasingly advanced level.

Van Wagenen (265) has pointed out that the poor quality of work frequently done by the bright pupil is due to retardation, instructional neglect in mixed classes, or "enrichment" of the curriculum through the addition of work that, although of new types, is not sufficiently difficult to challenge the best efforts of pupils. Inadequate educational provision may result in maladjustment in individual cases.

Freeman (217) observes that in the past we have stressed the distinction between acceleration and enrichment. In his opinion the real question is that of adjustment that aims at securing for the gifted the chance to work at a higher educational level. In his opinion acceleration provides for enrichment.

Usually, in considering enrichment as opposed to acceleration, the educator is not so much concerned with what enrichment may or may not involve as he is with keeping the gifted child from entering college or graduating from high school at what is, in his opinion, a premature age. Few teachers can sufficiently enrich the curriculum of the very bright child to justify slowing down his progress to an average rate and preventing his graduation from high school before the age of eighteen.

Terman (253) has listed suggestions for parents concerning the education of their gifted children. He observes that

(1) special attention should be given to social development; (2) vanity and egotism should be discouraged; (3) industrious habits should be inculcated; (4) information should be given when called for, and the child helped to help himself.

THE EDUCATIONAL TREATMENT OF OTHER TYPES OF
EXCEPTIONAL CHILDREN

Most problems of poorly adjusted children can be corrected through suitable instruction of parent and child or through modification of the child's environment. The educational treatment of children who are psychopathic, predisposed to delinquency, or have bad habits and attitudes must vary with the educational needs of the particular cases and should in all cases be based upon the complete diagnosis of the individual's difficulty. Many problems presented by nervous children can be solved by providing in the school situation work which is suited to their capacities and interests. Success in accomplishment, stimulated by proper encouragement from those of the child's elders whom he respects, contributes immeasurably toward solving the difficulties of such children. The removal of anxiety due to pressure is all-important. To be well adjusted, the child must be happy.

There is need of right habit formation from an early age. The present tendency is to begin observation of the problem child at an early period in the child's development. When the emphasis is placed on the early school years, the work can be preventive rather than corrective.

Most behavior deviates are in need of special programs of mental hygiene. Problem pupils do not usually come to the attention of the specialist until the difficulty is so grave as to be almost insurmountable. In unusually protracted cases extensive effort along the lines of reeducation may result in little improvement. A program of reeducation, if

undertaken early enough, will well repay the efforts of the educator. Reëducation almost invariably requires the coöperation of parents and teachers and the child's associates.

Hollingsworth (228) has suggested principles of mental hygiene applicable to problem children as well as to those normally adjusted. She proposes that :

1. The child should be trained to meet the real world.
2. No adult should fight the child's battles for him.
3. Coddling of the child should be avoided.
4. The child should be trained for self-reliance.
5. Fear should not be communicated to the child.
6. The child's work should be appropriate to his capacities.
7. No favoritism or partiality should be shown the child.
8. The child should be given rational sex education.¹

In the case of the unstable and predelinquent more than of any groups of problem children, the coöperation of the home is necessary for successful readjustments.

Too often in the case of poorly adjusted children the methods used in their reëducation have been superficial and have not gone to the root of the difficulty. Preceding reëducation there should be a complete investigation of the child's family, his school adjustments, his play life, his physical condition, nutrition, and opportunity for relaxation. Any one or all of these factors may be operative in the prevention of happy adjustments. The establishment of self-confidence and the removal of fears and repressions is frequently necessary for readjustment.

In all efforts at retraining exceptional and problem children no one agency will alone be successful in correcting or relieving the situation ; nor should any one agency be held responsible

¹ Adapted from Hollingsworth's *Helping the Nervous Child*, pages 11-14. Used by permission of the Bureau of Publications, Teachers College, publishers.

for therapeutic measures. Most children who are behavior problems require a twenty-four-hour-a-day program and schedule. This may well be planned and recommended by the school's child-study specialists. It should be carried out as a unified program by all the agencies concerned.

QUESTIONS AND TOPICS FOR FURTHER STUDY

1. Determine the range of individual differences in a class of forty pupils in a public school. What are the differences in age, capacity, achievement, cooperation, special talent, occupation of parents?

2. Measure and tabulate the extent of individual differences found in arithmetic achievement in the pupils of one classroom.

3. R. is considered dull by his teacher. Recommend tests to be used to check up on the teacher's judgment.

4. Determine the incidence of physical defect within one school class. Is there any relationship between physical and mental defect in the same group?

5. To what extent is feeble-mindedness due to physical defect? Is feeble-mindedness hereditary?

6. Select the potentially feeble-minded children in a public school enrolling five hundred children. What criteria do you use in making the selections?

7. What would you have told Louis's mother (page 92)?

8. What are the chief indications of mental subnormality in a school child?

9. One parent insists that a child is unusually bright. The school finds him a slow learner, although he has a number of clever tricks and some facility for learning things mechanically apart from their meaning. How would you explain the parent's opinion?

10. Is it possible to eradicate illiteracy entirely?

11. Are moral traits inherited? Cite arguments for or against this belief.

12. A boy in the fifth grade has developed feelings of inferiority in working with other children in the class. What should the teacher and school do?

13. B. is said by teachers to be a leader in the class. He is large, rather handsome, and sociable. Several tests show his IQ to be 88, his achievement in skills below average. How do you explain the teacher's judgment? What might be factors affecting the IQ? affecting achievement?

14. Rate a group of bright children, of dull children, and of normal children on character traits, industry, nervousness, social adaptability, aggressiveness, dependability. How do the three groups compare?

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15. What are the chief indications that a child is mentally superior or gifted?

16. How would you account for Herman's mature development (page 96)?

17. List all the types of problem pupils you have ever encountered. Do you find similar types of behavior in adults? What are some of the preventive measures that might be taken to eliminate undesirable behavior in its incipient stages?

18. Name the possible causes of speech defect. What objective materials are available for measuring the extent and kinds of speech defect?

19. Draw up standards for admission to special classes for dull children.

20. List some of the educational provisions you would make in classes for subnormal children who are between nine and twelve years of age. How much academic work should be given? Would you include music? art? household arts? industrial arts? literature? hygiene? How much time should be allotted to the activities to be included in the program? Would there be any advantage in using the project method? Is it more difficult to use the project method with subnormal pupils than it is with normal or gifted pupils?

21. List suitable educational provisions for gifted pupils. Should physical training and gymnasium activities have any place? Would it be necessary to stress creative work? Should there be training in industrial arts? in household arts? care of pets? personal hygiene? How much freedom would you allow? Would you organize the program on a subject-matter basis or group activities in terms of centers of interest or units of work?

22. How rapidly should gifted children in the upper elementary grades be advanced? Under what circumstances would you give a pupil an extra promotion?

23. List all the commonly heard arguments against the segregation of gifted children. Is there any evidence to prove that dull children profit from being grouped with brighter children?

24. Outline a program for the average classroom which would tend to insure normal adjustment of most of the pupils and prevent behavior difficulties. Describe provisions in terms of teacher training, teacher adjustment, classroom procedure, administrative procedure, organization of the course of study, materials of instruction, time allotments, provision for physical exercise, the proper time for the introduction of the skill subjects.

25. Should the teacher try to train the child in morality or character? Should she try to educate the child's emotions? What are the difficulties involved? Outline the things the teacher can do to insure the development of moral habits, desirable personality characteristics, and proper control of emotions.

CHAPTER SIX

INTENSIVE STUDY OF INDIVIDUAL PUPILS

INTENSIVE study of all deviating and problem pupils is a prerequisite for the educational guidance of such children. School files are replete with records of pupils who have caused continual trouble to a succession of teachers until they have finally managed to emerge from the sixth or eighth grade—stamped as failures. The behavior of such children has too often been judged only in the light of their school subject achievement as compared with that of average children; little or no consideration has usually been given to personality adjustment, the rights of the individual to self-expression, or the need for varied standards of achievement and adjustment.

The progressive school does not aim at conformity, eliminating those who do not conform, but includes as part of its program intensive study of deviates as a basis for rational education of individual pupils. The study of exceptional children must necessarily take precedence over the investigation of normal or well-adjusted pupils, but from a progressive point of view more adequate understanding of every pupil is desirable. If larger numbers of average and superior children received the intensive study of capacities and interests which has been restricted almost solely to subnormal or problem pupils, education would be more generally successful. To spend even a few hours in observing and compiling records for pupils who present no marked deficiency or extreme maladjustment may seem superfluous. However, the apparently well-adjusted child may become the maladjusted child. Furthermore, normal as well as abnormal pupils are better understood after an investigation of home background, opportunity, social adjustments, and developmental history, conducted prior to or simultaneously with instruction. The child learns more effectively when he is properly motivated,

when inhibitions are removed, and when instruction is suited to his needs. In view of these facts the intensive study of larger numbers of pupils is justifiable.

CASE STUDY IN CLINICAL PSYCHOLOGY

Witmer invented the term "clinical psychology" to designate the intensive study of individuals in which the findings of neurologists, medical specialists, social workers, and psychologists were assembled, summarized, and studied for their bearing upon the case under investigation. The purpose of such study is to discover the cause of malfunctioning in the individual and to recommend suitable educative measures to overcome the difficulties discovered. The method of study is somewhat analogous to the method of physical diagnosis by the medical profession.

"Clinical psychology," according to Gesell (1938), "is a form of applied psychology which attempts, through methods of measurement, analysis, and observation, to arrive at a true estimate of the mental make-up of the individual. It aims to interpret human behavior and to define its limitations and possibilities in relation to practical problems which require responsible diagnosis and a degree of prediction. . . . Clinical psychology may be defined as a normative psychology applied to developmental or behavior problems requiring interpretative diagnosis."¹ Its methodology includes:

1. A determination of the mental status of the individual; the establishment of normality, of subnormality, or abnormality.
2. A diagnosis of the case to determine the factors which have produced the discovered deviations. The interpretation of the individual's behavior in the light of his social background.

¹ From Gesell's *The Mental Growth of the Pre-School Child*, page 359. Quoted by permission of the Macmillan Company, publishers.

3. The formulation of a plan for remedial or corrective work to alleviate the difficulty.

The method of case study consists in bringing together all the available information about an individual, in analyzing the data so as to discover the causes of behavior deviations and trends, and in recommending remedial measures to correct maladjustments and make right adjustments possible.

In case study two phases are recognized, as suggested by Doll — the examinational and the investigational, or historical. The former includes the actual determination of status and behavior trends of the individual; the latter, the investigation of all environmental factors having a bearing upon the problem.

In case study we start with the difficulty and work backward to find the causes. A possible source of error in such work has been pointed out by Woodworth. He observes that we are usually not able to obtain all the facts, and unless we take unusual precaution, we may be unfair in assigning causes in explanation of the difficulties discovered.

Outlines for clinical case study are reported by Bronner, Burt, Huey, Mateer, Morgan, Pressey, Tredgold, Wallin, J. B. Watson, Wells, Woolley, and other authorities.¹

ESSENTIALS IN CASE STUDY

In an adequate case study the history as well as the present status of the case is investigated; subjective as well as objective methods of obtaining data are employed. Psychological examinations constitute a part but by no means all of the investigation. The study of the child in his social setting is most important if the nature of the problem is to be discovered. The case history provides the background for the study of the problem.

¹ See Bibliography on pages 259-279.

The most usual topics of investigation are the developmental and family history, the individual's educational history, the present mental and educational status of the individual, his environment, interests, aptitudes, desires, emotional trends, behavior trends, physical history, and present physical status. The chief sources of information are the home, particularly the parents and relatives of the child; the school, particularly the child's teachers and supervisors; his associates; and the child himself. The methods of obtaining needed information include the use of objective tests, the interview, observation, and study of records.

Six fields of investigation, based on the study of mentally deviating school children, are listed by Wallin (388) as follows: a mental examination, an educational examination and investigation, an environmental investigation, a physical examination, a developmental examination, an investigation of hereditary factors.

An outline for the case history phase of clinical study is given by the Presseys (247) as follows: history of the family — medical, social, educational, economic; history of the individual — medical, social, educational, economic history in childhood, adolescence, and adult life; history of the present crisis — medical, social, educational, economic history, symptoms, and course. The authors observe that "first, chronologically, is the information about the patient's family, then information about the patient himself; next is the history of the patient's present illness or more broadly (since the illness may be a failure in school, a theft, a quarrel with a foreman, or some other social, educational, or economic difficulty), the history of the present crisis. In the history of the family, the individual, the present crisis, there are to be considered medical, social, educational, and economic factors. . . . It should first be noted that in actual study of the case this outline is ordinarily used backward. That

is, the questioning naturally starts in with inquiries about the present difficulty, and works backward toward the history of the individual and his family."¹ The outline is applicable to the school child as well as to the adult.

A noticeable change in the emphasis given to different topics included in the case study of problem children, and particularly of the feeble-minded, is observed when earlier and later outlines are compared. There has been a marked change in the kind of information sought and in the methods of obtaining the necessary data. The most important change has come about through the development and application of standardized psychological tests.

A typical early examination of exceptional and problem school children is reported in the *Proceedings of the National Education Association* for 1908 (263). In this report a description is given of the examination used for candidates for Public School 120, New York City, a school for difficult children. The chief divisions of the examination were health record, school record, and special medical examination. Under the latter are included the following topics:

General condition.

- a. Anatomical — facial symmetry, palate, teeth, eyes, ears, lips, skin, body in general.
- b. Physiological — motor, sensory, condition of the heart.
- c. Psychical — balance, attention, peculiarities, proportion, memory, moral sense, will.
- d. Development.
- e. Family history — diseases, etc.

No other reference to mental characteristics occurs in the outline. Physical characteristics receive the most emphasis. In comparing this earlier outline of intensive study of defective school children with those of later date, much progress in the analysis of mental traits is evident.

¹From *Mental Abnormality and Deficiency*, page 16, by L. C. and S. L. Pressey. Quoted by permission of the Macmillan Company, publishers.

THE CASE OF JIMMY

The following outline was used in diagnosing the case of Jimmy, who was brought to the attention of a psychologist because of stuttering and poor school achievement.

1. Family history
2. Home background
3. Boy's developmental history
4. Physical development and status
5. Mental status
6. Special investigation of his particular difficulties
7. Study of the boy's personal characteristics
8. School history
9. Present school progress
10. A study of his special talents and defects

The following report is a brief summary of the facts discovered and their interpretation.

The child comes from an intelligent family, but the father has been dead for some time and the mother is inclined to shift to others her responsibility for the care and support of the boys. The younger boy has apparently always been the "goat." He has been treated with rough contempt by his brother, pampered and babied by his mother. Nevertheless he is inordinately fond of his brother, an exceptionally intelligent and capable boy, and tries to emulate his achievements. The older boy is ashamed of the younger one and would prefer not to have him around, although he will tolerate him if necessary. Jimmy is sensitive about his brother's attitude toward him, as is indicated by his constant effort to merit his confidence and esteem.

Jimmy has been undernourished much of the time since babyhood. His physical condition in other respects has been satisfactory. His developmental history indicates normal progress through infancy and early childhood except for the speech difficulty. This difficulty appears to have

developed at the age of two and a half or three years. Whether emotional shock was the cause of the difficulty is not known. The mother recalls, however, that the child was injured in a street-car accident at about three years of age and that the speech difficulty appeared at about the same time. Poor achievement in school subjects, particularly in reading and spelling, was largely attributable to the speech defect. So far as is known, the boy has always been right-handed.

Jimmy has the usual work and play interests of the normal boy of his age; he is still somewhat babyish, but is characterized as a very lovable and interesting boy. No unusual shyness, fear, or embarrassment is evident. The boy is normal in sex conduct and interests. He says that he formerly cheated in his school work, but he explained that most children in the large public schools he has attended cheated and he had never realized it was a thing he should not do.

Such school records as are available indicate normal progress in arithmetic but slow progress in reading and almost none in spelling during four years. Jimmy shows normal interest in his school work and is anxious to improve in the subjects in which he is now deficient.

A battery of tests was given the boy which included the Stanford Binet intelligence tests, a series of school achievement tests, performance tests, the Kent-Rosanoff Association Test, the Woodworth-Mathews questionnaire, articulation tests (unstandardized), tests of handedness, including grip and tapping.

The Binet test indicated an IQ of 129, and performance test results were better than average for a child of his age. School subject achievement was shown to be normal for grade in arithmetic, far below grade in spelling, and somewhat below grade in reading. Tapping and grip tests

showed the boy to be normally right-handed. Emotional balance tests showed him to be normal.

Speech work by specialists in a university center was begun with good results. The defect is still apparent, but it causes the child little embarrassment and is only severe when the boy is greatly fatigued or has been under unusual strain. Much of the gain, particularly over the summer vacation when no speech training was given, appeared to be the natural result of growth and maturity coupled with the child's own efforts to improve. The child has become much interested in industrial and fine arts with success in achievement which has established greater self-confidence. Remedial work in reading and spelling has been carried on with good success because of the child's intelligence and splendid coöperation.

The most important aspect of case work is retraining. This requires great skill for the achievement of satisfactory results. As in the case just described there are a multitude of habits to be corrected and new attitudes to be developed. These can be built up only through individual attention to each specific problem in the situation.

EXPLANATION OF PROBLEMS

Determination of the causes of difficulties discovered is the most troublesome task which confronts the psychologist. The diagnoses of child-study specialists are frequently invalid because of the tendency of some specialists to give an opinion in a hurry without necessary study or research, or because of the necessity of "making a case." The result is guess-work rather than cautious differential diagnosis.

Association does not necessarily imply causation. Too frequently causation is implied without controlling observations properly. How many specialists have delayed their statements of the probable causes of the difficulty until they

have obtained more information about the prevalence of certain characteristics presented in the population at large, or have controlled their investigations so that the causal factor or factors could be identified? Time and time again the child's difficulty is attributed to a severe bump on the head in infancy or the ministrations of an oversolicitous mother during a child's serious illness. But a large proportion of children in the general population have oversolicitous mothers, and many of them have experienced severe bumps on the head without developing abnormal behavior traits. Since it must therefore be comparatively rare for these experiences to cause the abnormalities generally attributed to them, it is necessary that extreme caution be exercised in controlling the investigation of the case in order to determine what factors are really causal. Most of the errors in diagnosis are made through generalization from particular cases without adequate controls. Sometimes the specialist makes elaborate interpretations and explanations of simple and obvious problems. One of the primary laws of science requires that of several possible explanations the simplest and most direct explanation be accepted.

CASE STUDY OF ADULTS AND CHILDREN

Much of the case study reported relates to work with adults or adolescents. In what respects, if at all, does intensive study of children differ from that of adults or adolescents?

In general, there is little difference in the plan and organization of the work. The major topics to be investigated in either case are quite similar. In the case of school children the problems may be expected to be defined less sharply and on the whole to be less extreme than the problems presented by maladjusted adults. The chief difference will appear in the nature and quantity of the data obtainable.

With school children detailed and exact data are available concerning the child's school achievement. In the case of the adult there will be more information about social relationships and vocational success. In children the diagnosis and recommendations for treatment center more largely in the school activities; in the adult, in vocational adjustments. The complications, physiological and emotional, entering into the problems presented by the adolescent and adult will be largely lacking from the problem of the young school child. In the case of the school child many of the problems coming to the attention of the psychologist may be classification problems; that is, difficulties which may be solved through the proper placement of the child in school. In the adult the problems more frequently involve social and occupational adjustment.

IMPORTANCE OF AN ADEQUATE PHYSICAL EXAMINATION

The importance of the physical examination of every exceptional child has already been emphasized. In the past the physical examination constituted almost the whole study of abnormal and psychopathic individuals. In the diagnosis of certain mental conditions it has been observed, however, that the diagnosis on the basis of the mental examination alone would have been unchanged by the results of the physical examination. This is true of most cases of subnormal mentality. The removal of adenoids, treatment of dental caries, correction of poor posture, although greatly beneficial to the individual, have in all but a few cases failed to remove mental deficiency, a fact which is generally recognized by the medical profession. The diagnosis of feeble-mindedness is now usually based primarily on psychological findings rather than on analyses of physiological concomitants.

However, without an adequate physical and medical examination and in some cases a thorough neurological exami-

nation the assumption that physical deficiencies are not the primary basis of the child's difficulty cannot be made. Some types of mental disturbance are directly caused by disease and physical deficiency. The services of competent medical specialists are needed for the diagnosis and treatment of such cases. A clean bill of health eliminates the possibility of physical complications as the source of difficulty.

THE MENTAL EXAMINATION

The mental examination is used to determine the individual's status with respect to capacity to learn or to adapt himself to new situations, educational achievement, emotional stability, interests, desires, inhibitory capacities, the presence or absence of psychopathy. The determination of the individual's status with reference to these traits constitutes the mental examination but not the complete clinical study of the case. The latter involves the evaluation of all the facts discovered, in the light of the individual's background and history. The psychological examination constitutes one phase of the complete clinical study.

The psychological examination is not at present completely objective or standardized although its less objective phases are becoming so. The use of both objective and subjective methods in the conduct of the psychological examination to determine the child's mental and educational status is shown in the following suggested outline for the psychological examination:

A. General examination

1. General intelligence examination — verbal, non-verbal, performance.
2. Educational and achievement tests — diagnostic and prognostic.
3. Supplementary examinations in view of special problems.

- a. Association tests.
- b. Vocational aptitude tests.
- c. Tests of handedness, motor control, speech control, and development.
- d. Character and emotionality tests.
- e. Tests of special capacities.
- f. Pedagogical examinations.

B. Subjective judgments

1. Observations of behavior with reference to normality, subnormality, or eccentricity.
2. Subjective observation of special abilities or disabilities.
3. School record and informal examination.
4. Interviews (with older pupils).

TESTS IN CLINICAL PRACTICE

The number of tests which may be used in studying the individual's mentality is almost limitless. The number of highly valid and reliable tests applicable to the study of individual deviations, capacities, and achievements is small. The best descriptions of suitable tests for use in clinical examinations are given by Wells (125) and Bronner (45). Many of the tests listed in the Bibliography at the end of the book are useful in clinical practice. Unstandardized or incompletely standardized tests are useful in observing how the child responds, but alone they are seldom reliable indicators of the normality or eccentricity of an individual's mental status or balance.

The tendency on the part of some specialists to disregard test results in the analysis of pupil problems is probably a reaction to a former tendency to place too much confidence upon the results of tests and to base decisions on the responses obtained from one or two tests used alone. No reputable psychologist claims that the results of a single test — the Binet,

for example — will suffice for a determination of the mental equipment of the individual who is being studied. Most psychologists agree, however, that the Binet test and similar instruments are among the most valuable tools with which the psychologist works, and that for some cases the Binet test used with other supplementary tests is an indispensable aid in the study of the mental capacities and developmental status of the individual.

Few tests have sufficiently high reliability for individual diagnosis and prognosis. The use of several tests as a battery serves to increase the reliability of the measures for individual diagnostic purposes. Many specialists overlook the significance which the more reliable group tests have for clinical diagnosis. The investigation need not be limited to individual tests simply because an individual diagnosis is to be made. A group test may, in fact, be a more valid and reliable measure of a trait than an individual test purporting to measure the same capacity. It is possible to analyze test findings in such a way as to contribute much to a diagnosis of the case.

Measurement of phases of personality other than intelligence have been attempted. Included in this group are tests of emotional trends; social, moral, and ethical behavior; will-temperament; drive; interests; and the like. Tests of honesty, trustworthiness, and inhibition are being developed. Tests of special capacities in the arts have been constructed and are now in experimental form. It is also possible to measure objectively with some degree of reliability and validity vocational interests, musical ability, mechanical ability, and trade aptitudes.

The realm of the emotions is not the province of any one group of specialists. Anthropologists, sociologists, psychiatrists, and psychologists have all contributed scientific studies in the emotional field.

Rating scales and questionnaires are frequently of value

in filling in the gaps left by certain inadequacies in tests in their present stage of development. At times the questionnaire becomes the only serviceable instrument for discovering pertinent facts.

The interview affords a means of supplementing the psychological examination in completing the case study. The interview is not highly reliable as a method of gaining facts except in the hands of an experienced interviewer, but its reliability has been observed to increase with experience on the part of the individual making the interviews. It is obvious that the interview affords the investigator many facts which would escape him if the study were carried on solely by observation of the individual's performance in standardized tests. The determination of motives may be uncovered, attitudes may be investigated, and fears or repressions removed by the interview possibly better than by any other means. In the method of psychoanalysis the interview constitutes the chief source of information about the subject.

Another means of discovering additional facts about school children is through daily schedules kept by the individual who is the subject of study. Such schedules may be used both as a method of diagnosis and as a means of correcting difficulties. A method of keeping daily schedules is described by Sturtevant and Strang (171).

STATISTICS AND PUPIL STUDY

Some specialists have the notion that test norms are worthless and that statistics and clinical case study are incompatible and mutually exclusive. Age norms of development and achievement are of great importance to the clinical psychologist in enabling him to become oriented in the study of the individual case. It has been observed that it is practically impossible to evaluate the mental development of

children of primitive races because of the difficulty in ascertaining accurate birth dates. To say that a certain child shows a particular degree of performance in a particular direction means little to the psychologist. He has constantly to ask, "How old was the child?" A worker with feeble-minded children, who had made use of some tests standardized wholly on feeble-minded children, found that he soon lost all sense of standard with respect to what feeble-minded children could do as contrasted with normal children. What constitutes an excellent performance for a feeble-minded child is obviously a very mediocre one for a child of normal intelligence. One who makes much use of standardized tests with the feeble-minded believes the tests at first to be much too difficult. When, on the other hand, he turns to the examination of the gifted, the tests appear to be much too easy. Such an illusion occurs if the examiner is not constantly referring to norms of performance. Attempting to study problem pupils as isolated cases without reference to standards of behavior is folly, since such standards exist, and it often results in erroneous interpretations.

Statistics are only facts reduced to mathematical terms. When facts are not susceptible to statistical treatment, the methods of statistics should not be employed. They should not be used when their use would obscure the facts to be interpreted. For example, one individual's growth curve would be obscured in the statement of the equation of the curve determined for a large group of children. On the other hand, statistical methods should be used whenever they simplify or clarify the interpretation of data or summarize facts concisely. In constructing objective measurements and determining their validity; in scaling tests; in determining central tendencies of groups, extent of dispersion, or the nature of relationships; in generalizing on the basis of data derived from individual observations; in establish-

ing laws of growth or development for different traits in individuals; in summarizing data for research purposes, statistical methods are indispensable.

Statistics and case study are not antagonistic. On the contrary, statistically derived standards of performance are essential as one phase of clinical work. Statistically determined standards may prove to be of little value after the first stages of the investigation if it is discovered that, to the extent to which tests measure the individual, he is normal. If, for example, a child is discovered to have normal intelligence, good health, and proper surroundings and still presents a behavior picture of maladjustment, standards may be seen to have served their purpose and to be of no further use.

Statistics are usually thought of as applying to the study of groups, and in clinical practice what is desired is the analysis of the individual. The study of a single individual need not necessarily be considered "less statistical" than the study of a group. The study of the individual is not complete if his relation to the general population is disregarded. Without the use of statistics the facts of individuality could never have been studied or identified.

The present tendency is toward more rather than less use of statistics in child-study problems, both with reference to the determination of central tendencies and variabilities of behavior of groups and in the delineation of the status of any individual.

PERSONNEL IN CASE STUDY WORK

A number of different persons are necessarily concerned either directly or indirectly in the analyses of the problems presented by individual pupils. Among those who have an important part to play in the assembling of facts and their interpretation are the psychologist, mental examiner, psy-

chiatrist, psychopathologist, school or family physician, neurologist, pediatricist, visiting teacher or social worker, and sociologist. Others who assist in the study and are chiefly responsible for the application of remedial measures are teachers, school administrators, parents, and social agencies.

The teacher's opportunities for assisting in case study work are great. In progressive schools much excellent observation of school children and shrewd interpretation of motives and conduct have been accomplished by classroom teachers without the formality of case study.

A variety of practice in the administration of case study is found in psychological clinics in schools. The persons most frequently found taking charge of the administrative details of the study are psychologists, physicians, and school administrators, the latter usually principals of the schools in which the children being studied are found. The prevailing practice in any community will be determined by the personnel of the clinic, the training and personality of the individuals composing the clinic, the history of the clinic, and the sentiment of the community. In all cases the best-qualified person in the group should take charge regardless of professional allegiance. In educational institutions this will usually be the child-study specialist whose training has included some study of the aims of education, the psychology of school activities, curriculum making, education for exceptional children, and mental adjustments.

The psychologist's contribution to case study work is not solely through the function of measurement, although measurement constitutes a major portion of his activities. The two major phases of case study are the collection of data dealing with the history of the case and the administration of examinations to determine the present status of the individual examined. The psychologist is more directly concerned with the latter phases of the work. The psychologist

may incidentally gather information about the history of the case which will be of significance in the diagnosis of the problem, but his major effort will be directed toward the determination of facts relative to the mental status of the individual examined and the interpretation of those facts with respect to the individual's background.

The activities related to history taking and the making of contacts in the home are functions performed by the social worker or the visiting teacher. There is a growing tendency for the visiting teacher, a trained worker connected with the school system, to take charge of the investigational phases of case study. Her duty is to collect the historical and sociological data needed for a proper understanding and analysis of the problem. Throughout the country the visiting teacher now appears to be doing a large share of the work in bringing about desirable relations between the home and school.

Many of the first visiting teachers were comparatively untrained persons with a flair for social work. They have more recently become a highly trained professional group. Formerly the work was connected closely with social service and consisted for the most part of elementary school instruction carried on in the home for children who for any reason were unable to attend school.

Deffenbaugh (11) has published an account of the visiting teacher movement in city school systems. According to his report cases requiring the services of the visiting teacher are maladjustments in scholarship, involving subnormality, retardation, or precocity; adverse home conditions — poverty, neglect, or improper guardianship; misconduct in and out of school; and irregular attendance. Among the cities emphasizing the visiting teacher movement are Boston, Dayton, Chicago, New York, Cleveland, Minneapolis, Rochester. There have been visiting teachers in New York since 1913. Their duties have been connected primarily

with the study of difficult children, the determination of the causes of poor scholarship, the investigation of unfavorable home conditions, and actual instruction of children in the home. Courses are now being offered in educational institutions for the training of visiting teachers.

STUDYING THE WHOLE CHILD

In too many clinics the child is treated as though he were three separate entities, a "mental" child, an "emotional" child, and a "social" child. The difficulty in reassembling the "whole" child is apparent. A complete analysis of the child's behavior usually necessitates the subdivision of the sum total of personality traits into workable units. Different specialists may investigate separate phases of the child's behavior trends and personality traits. There is no need, however, for such investigation to be conducted in water-tight compartments. Much overlapping in the study of the same child by different specialists is inevitable and wholly desirable. The psychologist may investigate the child's mental status, but he is working with the same child whose home environment the social worker is investigating. In some cases it is desirable for one person to study all phases of the case and to carry on remedial work. In this way diagnosis and retraining can be intimately related. The advantage in several persons' working on the problem lies in the variety of points of view presented. The major requirement is the integration of diverse aspects of the situation.

ORGANIZATION AND CONDUCT OF THE PSYCHOLOGICAL CLINIC

The best results are obtained in case study when the activities are carried on by an organized child-study bureau or psychological clinic. The organization of the clinic will vary with the size of the school population and the facilities provided for the functions to be carried on. In progressive

schools the clinic is under a director who administers the work, takes charge of staff meetings, and relates the work to the school system as a whole. The staff may include all the specialists mentioned in the previous section under the heading of personnel. If the school system is too small to afford this number of specialists, the director of the clinic is usually able to command the services of such specialists outside the school system when their services are needed in the study of special cases.

The functions of a clinic are remedial as well as examinational and diagnostic. Remedial measures should normally follow all case study work in which remediable problems have been revealed. In the case of one child, a girl of twelve, slightly below average in mental ability and suffering under intense emotional strain, improvement was brought about by changing the pupil from the regular sixth grade to a special junior high school class for girls studying home-making. Here the child was kept under close observation and every possible source of conflict was avoided. The mother was instructed to simplify the child's diet, to arrange for shorter and more frequent rest periods, to provide plenty of simple amusement, to avoid conflict with the child, and to require less of the child in terms of schoolroom accomplishment. At school the child was given ample freedom to do the things for which she showed special talent. She had for a time almost complete freedom from academic work, with which she had been having considerable difficulty in her former classroom, and she was given more opportunity for sports and physical exercise. The result within half a year's time was a considerable lessening of tension, a decided gain in happiness, and no little achievement of a very practical sort.

The failure of some clinicians to relate remedial work very closely to the work of the classroom and activities in the home has resulted in criticism of clinical work. Some

of the work carried on at the present time is futile for one or two reasons. (1) The remedial program recommended cannot possibly, under the existing conditions, be carried out. For example, the recommendation is frequently made that the child must be removed from his parents and present environment if alleviation of the difficulty discovered is to be effected. The recommendation may be impracticable, and parental education then appears to be the only solution of the difficulty. (2) The case study report may be too technical or too difficult for the persons who are to undertake the remedial work to comprehend and translate into practice. Parents and teachers are not usually highly skilled in psychological techniques and may therefore fail to comprehend the significance of the diagnosis reached. For instance, a school nurse reported that although certain children had been taken to a neighboring clinic for diagnosis she was unable to see what good was accomplished since teachers and others who were charged with instruction of the pupils examined were given no report of the outcomes in terms that could be readily understood.

Such conditions suggest the need for the closest coöperation between the clinic and the classroom if any benefit is to be derived from the work. They suggest, too, the need for the continued education of teachers, parents, and social agencies who are to coöperate in the work, concerning the principles of clinical psychology and the functions of the psychological clinic. In so far as possible, the psychological clinic in the school and all child welfare agencies in the community should coördinate their functions.

The *Psychological Clinic*, the journal of the psychological clinic established by Witmer at the University of Pennsylvania, is a valuable source of material illustrating case study and describing the method. Morrison (376) devotes a chapter of *The Practice of Teaching in the Secondary School* to

the subject of case work with problem pupils in the high school. Many of the suggestions are of value to the psychologist or administrator of an educational institution. A comprehensive series of case studies has been published by the Judge Baker Foundation of Boston. All the cases described had appeared in the juvenile courts of Boston. Intensive study of a group of gifted children in California is reported by Terman (255). The facts collected pertained to the developmental history of the child, environmental influences, educational progress, peculiarities, interests, and the like. The most complete descriptions of the clinical examination, details of administration, and application of the results in the solution of the particular problems are given by Wells (125) and Wallin (388).

QUESTIONS AND TOPICS FOR FURTHER STUDY

1. Choose a child of average ability who is a behavior problem in the classroom. List all the factors which appear to cause the difficulty, and make recommendations for retraining. Describe the different reports to be made to parents, teachers, school administrators.

2. Have teachers list all the problem pupils in an elementary school. What types of children do they tend to list most frequently?

3. Do you feel that if some grown person you know had been intensively studied in childhood later tragedies might have been averted? Describe the case.

4. Several psychologists prefer to summarize test findings in terms of a development quotient rather than of an intelligence quotient. What factors do you think should enter into a developmental quotient?

5. Study all the cases of truancy in an eighth grade. Tabulate such data as IQ, age, previous success in school work, wealth, father's occupation, child's interests. Compare these facts with the same facts for non-truants.

6. What data obtained in a case study will be most accurate? Which facts will have least accuracy?

7. Draw up your own outline for a case study in connection with the study of a particular child.

8. A medical examiner proposes a method of estimating the child's intelligence during the physical examination. What are the possibilities in this method? Are there any limitations? One specialist claims to

measure intelligence solely through motor tests which put a premium on rate of movement. How valid do you think this method would be?

9. With how young a child do you think the psychoanalytic technique is applicable? With what problems would you use the method?

10. How young a child can be satisfactorily interviewed? Attempt to interview three children, aged 5, 9, and 14, and compare your results.

11. How important is it in working with a behavior problem to change the child's attitude?

12. Does changing the environment always result in improvement, provided the new environment is superior in all respects to the old?

13. Where should you be likely to find more problem pupils, in a large public school or in a smaller private school?

14. Are there dangers in overdoing the study of problem children? What precautions should be taken in studying problem pupils in the school situation?

15. Is a child in the first grade, aged six and a half, maladjusted if he has difficulty in keeping still and sitting quiet even when a well-directed effort is being made by the teacher to maintain order in the classroom?

16. What are the functions of visiting teachers in modern schools?

CHAPTER SEVEN

DIAGNOSTIC AND REMEDIAL WORK IN THE SKILLS

IN acquiring mastery of the fundamental skill subjects — reading, spelling, arithmetic, handwriting, and the mechanics of composition — pupils with the same educational advantages differ widely. Some of these differences are due to differences in native ability, others to incorrect habits formed during the course of learning. Differences attributable to native capacity can be provided for through adjustment of the curriculum to individual needs. Pupils who fail to acquire the skills because of incorrect habit formation or wrong attitudes are in need of diagnostic and remedial work.

PRINCIPLES OF DIAGNOSTIC AND REMEDIAL WORK

The need for extensive diagnosis of the difficulties of individual pupils and for remedial work suited to their needs is, from one point of view, a reflection on the methods of instruction employed. This is true if large numbers of pupils have formed wrong habits in the process of learning. Such a situation would indicate a lack of adaptation of instruction to the individual needs of pupils from the beginning. To a limited extent, however, diagnostic and remedial work may always be necessary no matter how intelligently the individual needs of pupils are studied. In our present state of knowledge it is impossible to predict the nature of the learning curve in the acquisition of skills by individual pupils, even though many of the factors influencing pupil progress are fairly well known. There still remains the vast, little-explored region of the child's interests and desires, the subtle motivating forces within him and without. Until more extensive study is made in this field, educators will continue to make mistakes in the training of children. It is incumbent upon the school to investigate and remedy such mistakes as speedily as possible.

The term "remedial," in connection with school work, is often used inaccurately to describe any instruction of children who make slow progress in acquiring skills. Many children who are merely slow learners appear to be in need of remedial work. The term "remedial" should not be used in the sense of helping a slow-learning pupil to "catch up" with those who are brighter. Drill directed toward this end will in most cases prove futile. If a child has fallen behind others in achievement in school work, he is either a pupil who learns slowly because of limited capacity or he has formed poor habits of work. In the latter situation improvement will result when the incorrect habits are corrected and the attitudes changed. In the former case a study of the child will reveal the probable rate of progress to be expected in school work, and beyond this rate not much acceleration in learning that will be lasting in effect can be anticipated.

Occasionally school children show wide discrepancies between their ability to progress and their actual achievement in the classroom. Unless such children have exceptional ability amounting to genius, in which case it would be foolish to demand maximum achievement at a very early age, all children who show marked discrepancies between ability to perform and actual performance should be placed automatically with the group of children needing diagnosis. Cases in which the reason for the discrepancy is obscure and those not wholly remedial under ordinary classroom conditions are in greatest need of diagnosis and reëducation.

McCall (88) has found the chief causes of many of the learning difficulties of school children to be insufficient practice, improper methods of work, deficiency in fundamental skills, absence of interest, physical defects, subnormal intelligence.

Remedial work should be preceded by diagnostic study of the individual child. In some cases it is impossible to do any

corrective work in the school subjects until a complete case study has been made. In other cases not complicated by social or emotional maladjustment diagnosis can be restricted to the difficulty in school work. Sensory acuity should be tested in the early stages of the investigation.

Diagnosis should be preceded by an analysis of all the steps involved in the acquisition of a particular skill. Upon the basis of this analysis it is possible to diagnose the pupil's difficulty specifically and to suggest remedial measures for each separate stage in the learning of the particular skill.

In the process of diagnosis it is necessary to inquire: (1) What bonds has the child formed in the learning process? Are they desirable or undesirable? Do they result in successful or unsuccessful performance? (2) What bonds are not formed that the child should have formed at this stage in his learning? This knowledge is necessary for the elimination of undesirable habits and the formation of new ones.

Three types of investigation may be required for a complete survey and diagnostic program for pupils deficient in the skills. (1) There may be a survey by means of which samplings of pupil achievement are made and the pupils most in need of assistance detected. (2) Inventory and analysis of the particular skills in which the child is deficient may be made. This process is more intensive than that of the survey. (3) There may be a differential diagnosis, the purpose of which is to discover the nature and possible causes of the difficulties experienced by pupils.

The first of these stages is not analytical. The second may be slightly or highly analytical, depending upon the thoroughness with which the diagnosis is carried on. Information concerning pupil difficulties may be derived from informal observation of the pupil at work in the classroom, introspection by the pupil himself, and the analysis of objective test results.

THE USE OF TESTS IN DIAGNOSIS

General achievement tests such as the Thorndike-McCall Reading Test are useful in detecting pupils who need diagnostic work, but they are usually not sufficiently analytical or diagnostic. Standardized survey tests serve their function in indicating the child's general standing in relation to the others in the class, but they do not indicate the causes of deficiency nor analyze the case completely. It is of much more value to know why a child has a low score than to know simply that he stands at the low end of the distribution. For determining the causes of low scores, diagnostic tests are necessary.

A number of diagnostic tests have been constructed as the result of analysis of the processes of reading, spelling, and arithmetic. Not all diagnostic tests are valid and reliable, and few thoroughly explore all stages of achievement in the mastery of specific skills. In some phases of diagnostic work no one test may prove adequate for a thorough analysis of the difficulty. A battery of tests may be required.

In addition to survey and diagnostic tests in the particular skill with which the pupil has difficulty supplementary tests of intelligence and special capacities assist the specialist in understanding the problem. Tests of language usage, articulation, handedness, motor control and dexterity, perception, recognition, recall, inventiveness, imagery, speed of reaction, general information, and sensory acuity all contribute to the correct diagnosis in particular cases.

READING DISABILITIES

Under normal schoolroom conditions most children of normal mentality with no sensory or physical defects, reared in an environment of ordinary culture, learn to read with facility by the age of ten. The child who shows no interest in reading after a period of exposure, whose interest cannot

be aroused, or whose instruction proceeds with difficulty is unusual. Children are ordinarily interested in activities leading to reading and in the process itself.

If the child is deficient in reading, the cause may lie in the competition of other interests, in initial failures in beginning reading, in the employment by the teacher of a highly artificial system of reading from which there is no transfer to thought-getting and the ready comprehension of printed material, or in failure to apply with the individual child the method most suitable for him. The reading material may be meaningless, silly, grotesque, or unrelated to the child's background and interests. The child may not have felt any real need of reading. Much of his reading may have been done for him, and situations in which reading is needed may have been avoided. The child's lack of success breeds lack of interest, which delays learning. Success usually results in interest, which motivates further learning.

Reading is primarily a perceptual, associative, and interpretive process. The symbols of the printed page are not perceived by all children in the same way, nor is the interpretation of the symbols the same in all cases. Some children observe differences in the structure of words very readily, others must be shown these differences before they observe them habitually. Some children get the thought of the material read with less attention to single words, parts of words, or single letters composing the material than others. These subtle differences, which must invariably be attended to in instructing a group of children to read, are due to a number of factors. Among them are differences in intelligence, perception, background, interest, attention, and work habits. Bright children appear more capable of discerning slight differences in the appearance of words, and they utilize these cues more skillfully than do duller children. The nervous or unstable child often lacks the patience necessary for

close attention to reading material. This tendency is reflected in all other activities the child engages in. Children of narrow background and experience often have difficulty with reading because of unfamiliarity with the ideas expressed and lack of opportunity to relate the material read to common experiences.

Much of the failure evident in beginning reading may be traced to stress on the mechanical phases of the work in the utilization of some particular method regardless of the social and economic background of the pupils, their mental maturity, their habits of attention, their interest in the process, or their preparation for reading. Fewer difficulties develop if reading is delayed until pupils have acquired adequate vocabularies and have had meaningful experiences to which reading activities can be related. One child with ability slightly below average, who was reported as a disability case in reading, painfully spelled out every word he was attempting to read. He comprehended few of the individual words — to say nothing of the meaning of phrases and sentences — even though the test material was of primary level and the child had spent several years in school. He had been taught to spell rather than to read, and lack of comprehension resulted. The child's face lit up with a glow of interest when after a brief period of practice he found that he could read with understanding a simple story about airplanes based directly on several of his recent experiences.

A first-grade child with limited background was observed one day in a crowded classroom struggling with the phonetic elements of "cow" and other strangely unfamiliar words. The puckered brow indicated perplexity rather than comprehension and interest. The child was starting on the road to disability in reading through lack of preparation for the process of interpreting symbols. A few bright pictures accompanying a story on which the reading material was

based or an excursion which would provide first-hand experiences would have furnished a more satisfactory introduction to the reading process.

After extensive experimentation with different methods of teaching reading, Gates (1887) concludes that greater progress is made when practice is directed toward comprehension of the material read in such a way as to necessitate increased accuracy in word perception rather than when emphasis is placed upon some artificial system of word analysis, phonetics, flash-card drill, or similar devices. Drill on separate words should, if possible, be done within the context of the material to be read. New words should be mastered in so far as possible through context cues. With some children, however, this process leads to inaccuracies which may become habits. It is therefore necessary to train pupils in word-form perception. When the text of the material read does not provide all the drill a child needs in word perception, additional materials providing for repetition and requiring discriminating reading are necessary.¹

Although a few specialists advocate a return to the alphabet method in cases of confused perception, there seems little justification for such a procedure. The most stubborn cases the psychologist meets are usually victims of the alphabet method or of a highly artificial phonetic system of teaching reading.

The varied factors underlying the causes of reading deficiency and the many varieties of reading difficulties encountered in school children make it impossible to describe any single method for detecting and correcting deficiencies. Practically all non-readers or deficient readers who are of average general ability learn to read when correct analyses have been made and suitable remedial measures are undertaken. All learn to read if proper conditions for learning

¹ See the list of devices on page 161.

are supplied. No cases are reported in the literature of disability cases in which no progress was apparent when suitable instruction was provided. Specialists, among whom are Dearborn, Fernald, Gates, Gray, and Zarbes, agree that even the so-called "congenitally word blind" are usually only the victims of wrong habit formation due to improper methods of instruction or to the child's lack of facility in profiting from instruction. The disability is in the method rather than in the child.

In beginning reading the personality of the child to be instructed should direct the choice of method. That method, or combination of methods, is preferable which will give the child the quickest command of technique with the greatest resulting satisfaction.

SUGGESTIONS FOR THE REMOVAL OF READING DEFICIENCIES

The major defects in cases of reading deficiency with suggestions for their removal may be summarized as follows:

1. *Lack of interest in reading.* This lack may be removed through giving easy material related to the child's activities, thus insuring initial success. Remedial materials should be in harmony with the child's activities in order to provide real incentives for reading and more abiding interests in reading. The child should be permitted to exercise choice in the selection of reading materials. The material should be suited to the mental maturity of the child.
2. *Limited conception of what it means to read.* The child should experience a need for reading before reading activities are begun. Comprehension should receive more emphasis than word recognition or word calling. Reading activities should be prefaced by meaningful activities. The child should derive pleasurable experiences from his reading.

- 3 *Immaturity of general mental development* Reading instruction should be deferred until the child shows readiness. Reading should be introduced as the natural result of the child's developing requirements. The reading process should not be forced, and dull children should not be expected to compete with brighter children, to progress at the same rate they do, or to derive the same benefit from the same amount or method of instruction. In the more extreme cases of mental defect, the reading process should be introduced gradually in proportion to the child's ability to learn and comprehend.
- 4 *Faulty technique which interferes with fluency and facility in reading* Suitable drill devices for removing the wrong habits should be employed.
- 5 *Physical deficiencies, speech defects, poor motor coordination* Physical defects should be corrected, if possible, speech training should be given; the use of manuscript or print script rather than cursive writing is recommended to reduce confusion in perception of symbols. There is some evidence that confusion in perception may result if hand dominance is interfered with. The child should be permitted the use of his left hand if he is dominantly left-handed. The child's physique should be built up through improved diet and a balanced program of rest and exercise.

Evidences of deficiency are revealed in the child's behavior. Zirbes (310) lists the following indications of reading abnormalities: lack of fluency and facility, mispronunciation, substitutions, omissions, lack of interest in reading, excessive reading, discouragement, physical factors, lack of capacity, emotional disturbances, wrong conception of reading, problems of comprehension, inefficient work and study habits. She also makes suggestions for diagnostic and remedial work.

A successful method of attack in remedial work in reading is the imitation of the process through the common experiences of the child as he himself relates them. The child's story, dictated to the instructor, who rewrites it with any necessary changes in vocabulary, forms the basis for the child's first remedial lessons. This method is more likely to gain the child's interest and attention, to develop a favorable attitude toward the examiner, and to begin the work at the child's comprehension level than is a method of artificial drill based on material foreign to the child's experience or otherwise devoid of meaning for him.

THE CASE OF IRENE

Irene was referred for study by a vocational adjustments bureau where she had been sent for vocational guidance. Although nearly sixteen years of age, she had only recently reached the seventh grade in school and had never learned to read fluently enough to obtain information or to derive pleasure from even simple reading materials. Although she is not so bright as the average child, Irene's reading progress had been much slower than that of other pupils of her age and ability, slower than the rate of her general mental and social development.

At the vocational bureau the child was given the following tests, with results as indicated:

Stanford-Binet Intelligence Test

Mental Age 11

Intelligence Quotient 70

Toops Mechanical Assembly Test (one part)

Score 41 out of a possible 110 points

Time 53 seconds

(A score of 75 is necessary for accurate mechanical work, the average time for taking the test is 45 seconds.)

Woodworth-Wells Easy Directions Test

Score 80 per cent

Time 150 seconds

Woodworth-Wells Hand Direction Test

Score 60 per cent

Time 5.67 seconds

Garment Machine Operating

Score 34 (This score is barely passable and indicates that the child is probably too nervous for machine operating)

Porteus Maze

Mental Age 11-6

These scores were all below the average for Lienc's grade, especially in the time required to do the tests.

Observation of her ability in situations not involving reading indicates a possible maximum IQ of 85 or 90. On the Stanford Binet tests given her three years before, the resulting IQ had been 78.

The following program of study of her case was carried out:

1. An interview was had with the child to determine her attitude toward reading, interest in reading, amount of reading activity engaged in, her attitude toward her deficiency, the extent of her desire to learn to read.
2. Interview was had with representatives of the medical clinic and vocational adjustments bureau who referred the case and had already obtained the significant facts of the child's history.

A social worker had interviewed the parents, teacher, and physicians, and had obtained information as follows: from the teacher — her story of the child's progress in school, efforts toward remedial work, the child's success in other school subjects, progress made in reading, and effort shown to learn to read; from the child's physician and medical clinics where she had been a patient — information as to physical defects, disease history, present physical condition, details as to the developmental history, extent of study of the case in other clinics by other specialists, from the child's mother — the extent of the parents' education, attitude

toward reading, opportunity given the child for reading of different kinds, books in the home, sympathy with the child, their story of the child's difficulty

- 3 A testing program for the child was arranged
 - a Oral reading rate, comprehension, regularity, omissions, insertions, special difficulties Degree of difficulty of material already mastered
 - b Silent reading rate, comprehension, eye movements, attention span, degree of difficulty of the material read
 - c Spelling level of difficulty, types of errors, method of attack, ability in word building, ability in perceiving slight differences in words, method of attack in spelling a word.
 - d Word pronunciation and vocabulary
 - e Perception tests for words, letters, phonograms

As a result of this investigation the following facts were discovered. The child comes from a home of average culture. The mother, an intelligent woman who was forced to support herself after the death of her husband several years before, acts as the superintendent of an apartment house in a high-class neighborhood. There are two other children in the family, an older brother who completed the eighth grade and a bright younger sister, twelve years of age.

Irene has visited a number of clinics in an effort to discover the cause of her difficulty. Several years ago she went to one hospital where they gave her reading tests and studied her case for two years, but gave no reading instruction. It was thought her condition could be remedied through improving her physical condition. After that she visited another hospital clinic for a year and a half. Here she was given many tests and was used for demonstration before students, but she was given no reading instruction. Recently she was taken to a third hospital. There she was given a thorough

physical examination and a specialist looked into her reading difficulty. A social worker from the hospital obtained the case history. This hospital referred her to the vocational adjustments bureau which in turn referred her to the writer in the hope that the reading situation might be diagnosed and remedial work undertaken so that the child would have a better chance of getting the type of position she wanted.

The child completed the sixth grade last June, but she thinks the teachers promoted her from grade to grade because of her age rather than because she had succeeded in accomplishing the work required. She has attended several different public schools. She entered kindergarten at the age of five and a half, and repeated a number of grades. During her last year in school a bright pupil in an upper grade attempted to coach her in reading. The results she considers rather unsatisfactory. At one time in the lower grades she was placed in a special class. Here, she reports, the children were so dirty and deformed that her mother demanded she be replaced in the regular class. Her mother also thought this was best since the child was not receiving in the special class the additional help in reading that she needed.

One of Irene's chief difficulties now is that she thinks she is unable to read and protests, when urged to try, that she cannot do the task required. She derives some satisfaction from this and makes it an alibi for her shortcomings. A little extra effort in response to the examiner's urging frequently results in a successful response. Another of her difficulties arises from the fact that she is interested in the things girls of her age like — dancing, skating, house parties — and would prefer to read stories of the "Sally-at-boarding-school" type rather than fairy tales or personified animal stories. Reading material of third-grade difficulty but describing mature activities is wholly lacking.

Irene shows more ability to comprehend than mastery of technique at present. This is a hopeful sign. Gain in technique should enable her to read with facility equal to her vocabulary comprehension level. She knows the meaning of a large stock of simple words that she is unable to recognize in print.

Results, in terms of grade equivalents, of tests given Irene were as follows:

Stanford Achievement Reading Test	3.2
Haggerty Reading Sigma I	3.0
Gates Primary Reading Tests Type I	3.2
Gates Primary Reading Tests Type II	3.4
Gates Primary Reading Tests Type III	3.0
Gray Silent Reading Paragraphs	
Rate	9 words a second (about 3d grade level)
Comprehension	3d grade level
Gates Graded Word Pronunciation Test	1.0
Gates Tests on Phonetics Ability	1.0 to 2.4
Gates Perception Tests, Words	2.2
Gates Selection Tests, Words	4.2
A partially standardized spelling test consisting of first, second, and third grade words . . . (approximation) 3.0	

Remedial work with Irene is being organized and carried on somewhat as follows.

- 1 Building up of confidence by showing how awkward even adults are in learning different skills, by assuring her that she can now read better than she believes, by assuring her that similar cases are well known and have been helped materially, by suggesting that there may be some material she may never need to read. In order to instill confidence, she is given easy story reading that is not too babyish. Books labeled "Second" or "Third Grade Reader" are avoided, as are books having infantile illustrations.
- 2 Remedial work that is to a large extent based upon real

situations. Her reading efforts are being directed largely toward life's most important demands. In her case these are health, home-making, vocational adjustment, use of leisure time, and self-improvement.

Illustrating the written material cut from newspaper advertisements and keeping these in a loose-leaf notebook for review and reference has proved interesting and instructive. Irene takes great interest in newspaper comics, material that can be used to good advantage in her case. Emphasis is placed on thought-getting throughout the whole course of the remedial program.

- 3 The correction through suitable exercises of wrong habits already established, e.g., spelling out each unknown word
- 4 Drill on word meanings to extend vocabulary
- 5 Drill in phonics to improve attack on new and unfamiliar words
- 6 Improvement in the technique of looking ahead and getting unfamiliar words from the context
7. Improvement of other closely related skills — spelling, handwriting, word pronunciation, and word meaning; improvement of methods of study, habits of concentration and attention
- 8 Rewards in some tangible form for worth-while achievement

DIAGNOSTIC AND REMEDIAL MATERIALS IN READING

The following analytical and diagnostic test materials are recommended for the discovery and diagnosis of pupil difficulties:

Edwards Diagnostic Tests for Second and Third Grade Reading Houghton Mifflin Company, Boston

Bruckner-Edgman Diagnostic Reading Test Minneapolis Board of Education and Educational Test Bureau, Minneapolis, Minnesota

- Denver Diagnostic Reading Tests* Public Schools, Denver, Colorado
Gates Primary Reading Tests Bureau of Publications, Teachers College, Columbia University, New York
Gates Silent Reading Tests Bureau of Publications, Teachers College, Columbia University
Gray New Standardized Oral Reading Check Tests Public School Publishing Company, Bloomington, Illinois
Gray Oral Reading Paragraphs Public School Publishing Company, Bloomington, Illinois
Gray Silent Reading Test Public School Publishing Company, Bloomington, Illinois
French Diagnostic Reading Tests Public School Publishing Company, Bloomington, Illinois
Sesqui-Woody Reading Tests World Book Company, Yonkers-on-Hudson, New York

Materials useful in both general and remedial work in reading, most of which are applicable to elementary work, include the following

- Courts-Smith Picture Story Reading Lessons* World Book Company, Yonkers-on-Hudson, New York
Best Work for Silent Reading (First, Second, Third, Fourth Grades) Webster Publishing Company, St. Louis, Missouri
Foundation Reading Cards, by MAURICE GOLDSMITH Series I, containing action word cards, initial phoneme word cards Series II, noun word cards, supplementary initial phoneme word cards Pioneer Publishing Company, Fort Worth, Texas
Horn-Shields Silent Reading Flash Cards Ginn & Co., Boston
Hunt and Find, a book of silent reading, by JESSIE FAHNT and ETHEL FEUERL Beckley-Cardy Publishing Company, Chicago
"I Made It," by MARY G. MALONEY and ETHEL E. ANDERSON A practical form of silent reading seatwork applicable to any system of teaching reading Milton Bradley Company, Springfield, Massachusetts
Keystone Pre-primer Booklet Series, prepared by LAURA ZIEGLER Keystone View Company, Inc., Meadville, Pennsylvania
Learn to Study Readers, by EUGENE HORN and Others Ginn & Co., Boston
Make a Book, by MAURICE MOORE and H. B. WILSON D. C. Heath & Co., Boston
My Farm Book, by LAURA ZIEGLER Bureau of Publications, Teachers College, Columbia University, New York
My Book Series, by MARGUERITE HANBY Wheeler Publishing Company, Chicago
My Workbook in Phonics, by MARGUERITE HANBY Wheeler Publishing Company, Chicago

- My Progress Book in Reading* Books One and Two Looseleaf Edition, Inc., New York
- My Work Book in Reading* Book One, by EDNA M. ALDRICH and JESSIE F. McKEN Harter School Supply Company, Cleveland
- Practice Exercises in Careful Silent Reading* Sets One and Two, by G. T. BOWEN Wheeler Publishing Company, Chicago
- Read and Do*, by MARCEL C. BRUNSTON and GUNTERVOLD M. WATTS Hall and McCrory Company, Chicago
- Self-Corrective Exercises for Reading Comprehension* Series A, by JESSIE E. INGRAMM Research Service Company, Los Angeles, California
- Silent Reading Devices* First Series, for Junior High School, by DONOTY DANKORT Henry Holt & Co., New York
- Standard Test Lessons in Reading*, by W. A. McCALE and LILIAN MAY CHADDS Teachers College, Columbia University, New York
- Story Methods of Teaching Reading and Spelling*, by G. W. LARSEN Lewis Publishing Company, Chicago, Illinois
- Tony Tony Runs*, by LUCIEN ALLARD and WILLIAM A. McCALE Johnson Publishing Company, Richmond, Virginia
- Toby's and Tony's Tales*, a workbook in beginning reading, by MAUR E. PRINCE Harter School Supply Company, Cleveland
- Twenty Suggested Silent Reading Games*, by RUTH O. WILLIAMS Johnson Publishing Company, Richmond, Virginia
- Watkins Silent Reading Tests* J. B. Lippincott Company, Philadelphia
- Winnetka Individual Reading Materials for First Grade* Rand McNally & Co., Chicago
- Work That Is Play* *The Pupil's Workbook in Reading*, by LURA M. EVERTSON and CLARE W. ROBERTS Ginn & Co., Boston
- Work-Play Books*, by ARTHUR I. GATES and MIRIAM S. HUNER A workbook accompanies each of the four books in this series Macmillan Company, New York

The Twenty-fourth Yearbook of the National Society for the Study of Education contains a description of aids and checks in the teaching of reading

DISABILITIES IN ARITHMETIC

Most arithmetic deficiencies are due to inadequate drill, wrong emphasis, or failure to check the mastery of fundamental processes during the course of learning. Inventory of the pupil's achievement will reveal specific weaknesses. Carefully controlled and distributed drill will remove them.

The postponement of drill on mechanics until a wealth of first-hand experiences has been provided for usually facili-

tates later mastery of the skills. In too many schools drill on the four fundamentals is begun in the first grade without an inventory of the development of the pupil's number concepts or his experiences with numbers.

Many disabilities arise out of the distaste developed through too monotonous drill with no reference to the use of numbers in natural problems such as counting the number of spoons needed for the party, the cost of the party for each person, the measurement of curtains, and the like. One boy reported deficient in number skills was found to be particularly interested in musical instruments. Study of descriptions of the instruments, their measurements, and prices found in a mail-order catalog afforded him much pleasure. This situation was made the basis for constructive work in arithmetic with satisfactory results.

Not all the arithmetic the child needs to learn can be provided through natural experiences or a school program giving prominent place to such experiences. Computations required in natural situations are limited in scope. Number work restricted to natural situations only results in overlearning of some facts and neglect of others. After the initial basis of experience has been gained, mastery of computation techniques must be provided for through drill to insure automatic command of the processes. That too much time is usually given to number drill is suggested by Knight and Behrens (1937), who have estimated that drill properly motivated and distributed would result in pupil mastery of the fundamental addition facts in a total period of time not exceeding six hours.

Disabilities may occur both in abstract computation exercises and in written problems. In the latter case reading deficiencies may cause much of the difficulty. The child with a small vocabulary and little reading efficiency will obviously be handicapped in attempting to solve written problems.

The theory underlying diagnostic and remedial work in arithmetic and other skills is that mastery of any skill is dependent upon the mastery of specific skills of which the total skill is constituted. Until the diagnosis of the pupil's weaknesses in specific skills is made, it is impossible to undertake worth-while remedial work. Intensive analysis has been made of the different processes of arithmetic, the habits and skills involved, and the outcomes desired. Thorndike was one of the earliest psychologists to study the development of children's number concepts and the organization of habits involved in arithmetical processes. Similar investigations have been carried on by Judd, Buswell, Countess, Monroe, Clark, Schoaling, Uhl, Stevenson, Clapp, Minnick, Hillegas, and then students.

Buswell and John (1933) have recently published a report of analysis of the difficulties in arithmetic observed by them in 585 subjects. They report three types of investigations undertaken:

- 1 Laboratory analysis of the mental processes involved in column addition.
- 2 A study of the time required for various operations in arithmetic.
- 3 A classroom experiment involving the diagnosis of pupil's habits of work.

As a result of this research a series of diagnostic tests in the fundamentals of arithmetic has been prepared. These tests provide for a verbatim report of the child's responses in solving problems. The child is encouraged to do his thinking aloud so that the teacher or examiner can make a record of the methods used. At the time of the test no effort is made to correct improper habits of work or incorrect methods. Skilled questioning is necessary on the part of the examiner during the test. As the child works, the teacher checks on

the diagnostic chart the types of habits the child exhibits, at the same time recording the child's procedure in working out each problem

Errors in habits of work in addition given in the Buswell-John chart include the following ¹

- 1 Made errors in combinations
- 2 Counted
- 3 Split numbers
- 4 Added carried number last
- 5 Irregular procedure in column
- 6 Forgot to add carried number
- 7 Carried wrong number
- 8 Grouped two or more numbers
- 9 Dropped back one or more tens
- 10 Added carried numbers irregularly
- 11 Omitted one or more digits
- 12 Disregarded column position
- 13 Wrote number to be carried
- 14 Depended upon visualization
- 15 Added same digit in two columns
- 16 Skipped one or more decades
- 17 Retraced work after partly done
- 18 Used wrong fundamental operation
- 19 Derived unknown combination from familiar one
- 20 Made error in writing answer
- 21 Carried when there was nothing to carry
- 22 Disregarded one column
- 23 Made errors in reading numbers
- 24 Lost place in column
- 25 Used scratch paper
- 26 Added pairs giving last sum as answer
- 27 Wrote carried number in answer
- 28 Added same number twice

Other lists which overlap to some extent are given for the processes of subtraction, multiplication, and division

¹ From *Diagnostic Tests for Fundamental Processes in Arithmetic*, by Guy T. Buswell and Lenore John. Used by permission of the Public School Publishing Company, publishers

THE CASE OF CHARLOTTE

Charlotte had never attended school up to the time she entered the fifth grade. All former instruction had been given her by her mother and tutor. Her achievement in languages, history, and literature was, for a child of her age, unusual. In arithmetic her achievement was not adequate for the work of her grade. Her mental ability was better than average. The mother reported that the child had been given little opportunity for arithmetic experience, a fact which, she believed, accounted for the child's poor showing.

The child was given the Buswell-John diagnostic tests at the middle of her first year in the junior high school. The examiner reported that the child was slow, uninterested, and in need of drill in the fundamentals. On the Buswell test the examiner observed, "I gave Charlotte the four parts of this test at different times and find in each one that she is unbelievably slow but usually correct. Few bad habits were observed." The following types of errors were checked.

ADDITION ERRORS

Made errors in combinations
Added carried number last
Forgot to add carried number
Retracted work after partly done
Added carried number irregularly
Grouped two or more numbers
Derived unknown combination from familiar one
Disregarded one column
Skipped one or more decades

SUBTRACTION ERRORS

Made errors in combinations
Did not allow for having borrowed
Derived unknown from known combination
Confused phraseology

MULTIPLICATION ERRORS

Made errors in combinations
Made error in adding the carried number
Carried a wrong number
Made errors in addition
Forgot to carry
Used multiplicand and multiplier
Used wrong process — added
Made illegible figures
Confused partial product
Carried when unnecessary

DIVISION ERRORS

Timed at long division. Slow, figures result in head before writing answer. Very slow on some combinations. High degree of accuracy. Test not completed because of the child's slowness.

Remedial work directed toward practice in making number responses automatic and consequently more rapid was begun. Good progress has resulted, although there is little expectation that the child's arithmetic achievement will be brought up to the level of her other accomplishments. The results of her attempts on the Woody-McCall arithmetic tests, which are given annually in January, are as follows.

GRADE	GRADE SCORE
7	58
8	54
9	75

The child's attitude has been difficult to remedy. She would be glad to dispense with study of mathematics and devote all of her time to other dominant interests. Had remedial work or regular instruction in arithmetic been begun at an earlier period, her achievement level at the present time might have been much higher.

DIAGNOSTIC AND REMEDIAL MATERIALS IN ARITHMETIC

The following materials have been found satisfactory for analysis and diagnosis of arithmetic achievement. Some of the most useful materials are starred

Bruckner Diagnostic Tests in Fractions Educational Test Bureau, Minneapolis, Minnesota.

Bruckner Diagnostic Test in Whole Numbers Educational Test Bureau, Minneapolis, Minnesota.

**Burnell-John Diagnostic Test for Fundamental Processes in Arithmetic* Teacher's Diagnostic Chart. Public School Publishing Company, Bloomington, Illinois.

Clapp Standard School Tests Number Combinations, Operations with Integers, Oral Test. University of Wisconsin, Madison, Wisconsin.

**Coopers Diagnostic Tests in Arithmetic* Scott, Foresman & Co., Chicago.
Foran Diagnostic Computation Scale The Catholic Education Press, Washington, D. C.

Haras Mann Diagnostic Tests J. B. Lippincott Company, Philadelphia.
Johnson Self-Diagnostic Tests in Arithmetic Rand McNally & Co., Chicago.

Los Angeles Diagnostic Tests Fundamentals of Arithmetic and Recovery in Arithmetic. Research Service Company, Los Angeles, California.

Lunsford Number Tests Kansas State Normal School, Emporia, Kansas.

**Macroe Diagnostic Tests in Arithmetic* Public School Publishing Company, Bloomington, Illinois.

Philadelphia Diagnostic Test in the Fundamentals of Arithmetic Division of Educational Research, Public Schools, Philadelphia.

Pittsburgh Arithmetic Scale Public School Publishing Company, Bloomington, Illinois.

Pries Diagnostic Test of Processes of Working with Common Fractions State Board of Education, Enid, Oklahoma.

Reese-Smith Diagnostic Tests in the Fundamental Operations of Arithmetic and in Problem Solving University of Chicago Press, Chicago, Illinois.

Schulz-Clark-Potter Arithmetic Test World Book Company, Yonkers-on-Hudson, New York.

Spencer Diagnostic Tests in Arithmetic Bureau of Educational Research, University of Cincinnati.

**Staten's Arithmetic Problem Analysis Test* Public School Publishing Company, Bloomington, Illinois.

Wilson Inventory and Diagnostic Tests in Arithmetic University Publishing Company, Chicago.

**Wisconsin Inventory Tests in Arithmetic* Public School Publishing Company, Bloomington, Illinois.

The *Compass* series provides tests for diagnosing the following functions: addition, subtraction, multiplication, and division of whole numbers, fractions, mixed numbers, decimals, and denominate numbers; measurement, basic facts of percentage; interest and business forms, definitions, rules, and vocabulary of arithmetic, problem analysis and problem solving, elementary and advanced.

Each of these tests contains subdivisions which make the tests even more highly analytical than they would otherwise be. Test One, for example, includes five parts: (a) basic addition facts, (b) higher decade addition, (c) column addition, (d) carrying in column addition, (e) checking answers in addition. The tests are accompanied by a set of drill materials affording practice in each skill.

Materials useful for remedial work and drill in arithmetic include the following:

- BUCKINGHAM-CASEY *Searchlight Arithmetics* Ginn & Co., Boston
BENT *Self-Instruction Arithmetics* Rand McNally & Co., Chicago
BOWEN-JONES *Teaching and Practice Exercises in Arithmetic* Wheeler Publishing Company, Chicago
CLAPP *Drill Book in Arithmetic* Silver, Burdett & Co., New York
CLARK-OTIS-HATTON *Instructional Tests in Arithmetic for Beginners* World Book Company, Yonkers-on-Hudson, New York
COATES *Standard Practice Tests in Arithmetic* World Book Company, Yonkers-on-Hudson, New York
DEGROOT-FIRMAN-SMITH *Frequent Graded-Difficulty Number Cards* Irregular Publishing Company, Ighiteau, New York
DELMAT-McCALL *Standard Test Lessons in Fractions* Bureau of Publications, Teachers College, Columbia University, New York
EVELLY *An Oral Drill Book in Arithmetic* Public School Publishing Company, Bloomington, Illinois
FOULKES-GOFF *Practice Tests in Arithmetic* Macmillan Company, New York
GREENE-STODERAKER-RICH-KESNER *Economy Remedial Exercise Cards in Whole Numbers* Scott, Foresman & Co., New York
HILLISMAN-FRANCK-BAKER *Horace Mann Supplementary Arithmetics* Books I and II J. B. Lippincott Company, Philadelphia
HOSER-KELLEY *Arithmetic Cards Practice Exercises for Grade Three* Wheeler Publishing Company, Chicago.

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- JOHNSON *Arithmetic Practice Exercises and Tests* Rand McNally & Co., Chicago
- LAIRD *Practice Exercises in Arithmetic* Lyons and Carnahan, Chicago.
- LAYMAN *Work, Drill, and Test Sheets in Arithmetic* Lindsay Brothers, Inc., Chicago
- LESLIE *School Individual Practice Exercises in Arithmetic* The Lincoln School of Teachers College, Columbia University, New York
- McDANIEL *Individual Number Drills* Plymouth Press, Chicago.
- *Mastery Units for Individual Learning* Plymouth Press, Chicago
- McMURRY-BENSON-JACKSON *Arithmetic Practice Books*, Macmillan Company, New York
- MILES *My Work Book in Arithmetic* Harter School Supply, Cleveland, Ohio
- *Fact Problems in Arithmetic* Harter School Supply, Cleveland, Ohio
- *Self-Teaching Cards* Harter School Supply, Cleveland, Ohio
- QUINN *Correlation Exercises in the Fundamentals of Arithmetic* Houghton Mifflin Company, Boston
- POWERS-LOKER *Practical Exercises in Rapid Calculation* Ginn & Co., Boston
- REAVEN *Practice Tests in the Fundamental Operations* Plymouth Press, Chicago
- RUCH-KNIGHT-STUDENBAKER *Arithmetic Work Books* Scott, Foresman & Co., Chicago
- SCHULTZ-CLARK-PORTER *Instructional Tests in Arithmetic* World Book Company, Yonkers-on-Hudson, New York
- STEIN-HOCKING-BROWNFIELD *Objective Drills in Arithmetic*, Benjamin H. Stebbins & Co., New York
- STUDENBAKER *Economy Practice Exercises in Arithmetic* Scott, Foresman & Co., New York
- THOMPSON-BOULWARE *Practice Tests in the Four Fundamentals of Arithmetic* Rand McNally & Co., Chicago
- TRUESDILE *Exercises in Arithmetic* Books I to V Rand McNally & Co., Chicago
- WASHBURN *Individual Arithmetic* World Book Company, Yonkers-on-Hudson, New York
- *Individual Arithmetic Cards* Plymouth Press, Chicago
- WASHBURN-WILSON *Speed Practice and Tests in Arithmetic* Winnette Individual Materials, Inc., Winnetka, Illinois
- WILKMAN *Practice Tests in Common Fractions* Plymouth Press, Chicago.

SPELLING DIFFICULTIES

Accurate spelling is based upon accurate visual perception of words to be spelled, association of the sound of the word with the visual image of that word, and the ability to call

up a visual, auditory, or kinesthetic image of the word when it is to be written. Spelling is for the purpose of translating thought into written word symbols. The most desirable spelling exercise is therefore the writing of words in the context in which they are to be used.

Disabilities occur in children lacking correct perception and clear imagery of word forms and ability to translate the image into written form. They may result from inattention, insufficient and incorrect drill, distaste for the subject, and other factors.

The analysis of the child's difficulty should be begun with an inventory of his ability to spell a large number of words within his maturity level. A study of the types of errors made will reveal the child's particular weaknesses and idiosyncrasies.

Necessary steps in the detection and treatment of pupils suspected of needing remedial work in spelling are the following:

1. The survey by objective means of all the pupils about whom information is desired. This survey should include the administration of several standardized tests and the tabulation of pupil's errors in written work, dictation exercises, and the like.
2. The selection on the basis of these tests of the pupils most in need of further study and remedial work. The diagnostic work should be continued by the use of further tests of an analytical character. Such tests should measure the pupil's ability to spell in a wide variety of situations, as well as his perception of words, numbers, and figures. Tabulations should be made of pupil's errors classified on the basis of the types of errors made. In the more extreme cases of disability complete developmental, school, and social histories should be compiled.

- 3 Remedial work based on psychological principles should be planned for each individual case requiring more than the average amount of instruction and drill. Drill material in the form of practice exercises so designed that the form of the spelling exercise will be as nearly as possible like the situation in which the pupils ordinarily spell will assist the pupil in forming desirable attitudes toward spelling, will permit most of the practice to come on the more troublesome words, and will provide for the proper amount of repetition.

In an analysis of the spelling errors of a number of disability cases, Hollingworth and Winford (294) report many errors due to lapses and individual idiosyncrasies akin to lapses. An analysis was made of the frequency of errors in syllabic sequence. As a result of this analysis the authors concluded: "It is clear that the first elements in words have a decided advantage over final elements, and that both first and last elements have a distinct advantage over intermediate elements. This is consistent with the experimental results from studies of memory span for digits and nonsense syllables. The initial element in words (the first letter) is almost invariably recalled correctly, even by the poorest of our spellers. The implication for pedagogy here seems to be that stress should be placed on intermediate and final syllables in the teaching of new words, as the initial element tends to take care of itself. This is true of the best of our spellers as well as of the poorest."¹ An investigation of the relative difficulty of polysyllables, disyllables, and monosyllables showed that the difficulty of words depended upon the number of letters they contained, and that the number of syllables was not an important matter. However, a more thorough investigation of this point is probably needed.

¹ From Hollingworth and Winford's *The Psychology of Special Disability in Spelling*, page 48. Quoted by permission of the publishers, the Bureau of Publications, Teachers College, Columbia University.

Hollingsworth concludes that causes other than specific disability in forming bonds necessary for spelling words are at the root of many of the difficulties. The most frequent causes appeared to be "general intellectual weakness, lack of interest, distaste for mental drudgery, intellectual inertia, previous learning in a foreign language, sensory defects, and bad handwriting." It was found that knowledge of the meaning of the words spelled increases success with the spelling, that the auditory perceptive element is a strong one in influencing spelling success, and that many of the errors on the part of pupils are due to poor articulation.

Spelling errors may be classified according to the type of error made or according to the tendencies of the person making the error. Burt (49) gives classifications of errors in spelling from both standpoints: the first classification from the standpoint of the error made, the second, from the standpoint of the individual making the error. Sixteen errors of the first category, due chiefly to faulty auditory or motor perception, are listed and illustrated by Burt. In the second group the errors listed are of the following types: lapses — the child knows the correct spelling but for the moment fails to reproduce it, extemporizations — the child does not know the correct spelling and therefore invents, usually from analogy with the construction of more familiar words, an impromptu spelling of his own, habitual errors — the child appears to have learned an incorrect form which has become fixed in place of the correct form, idiosyncrasies — many children are addicted to some one characteristic type of blunder. Again the same error is repeated in different forms or in different words.

Burt suggests that the diagnosis of spelling deficiency should be both quantitative and qualitative. The psycho-analytic method occasionally proves useful in discovering the motives causing disinterest in spelling.

A successful attempt at diagnostic and remedial work in spelling is reported by Witty (309). Children much below age and grade norms for spelling in the Scarborough School were reported by teachers to the psychologist. Several types of preliminary examinations were given. It was thought that the spelling deficiencies reported might be due to sensory defects, to low general intelligence, or to reading difficulties. Consequently all the children were tested in all these capacities. Each child was checked for auditory and visual defects. The degree of intelligence was determined by standardized tests. The Thorndike-McCall reading tests were given to all pupils. The results of the reading tests indicated that in no case did the disability seem due to reading deficiencies. In detecting incorrect habits or weakly formed bonds, the following diagnostic outline was used:

1. Attention to syllables
 - a. Rhythmic pattern of word
 - b. Differentiation of syllables
 - c. Phonic quality of each syllable
2. Establishing a new or unique reaction
3. a. Distinguishing between possible and impossible ways of writing a given sound unit
 - b. Spelling particular word units according to their proper sound-unit categories. Ten categories are listed
4. Forming letters legibly in handwriting
5. Coordination and motor control. (Lapses, slips, reversal of order, omissions, insertions) ¹

The children were also tested with lists from the Buckingham Extension of the Ayres Scale and the dictation test of the Stanford Achievement Test battery. A classified list of words for remedial work was prepared. The composition and regular written work of the children were examined. All the spelling errors of each child were listed according to the

¹ From Witty's "Diagnosis and Treatment of Poor Spellers," in *Journal of Educational Research*, Vol. XIII (January, 1923), pages 41-48. Used by permission of the Public School Publishing Company, publishers.

outline. The child was then checked orally on the misspelled written words, and consistent oral misspellings were again checked and tabulated according to the outline.

Most of the errors could be classified under specific habit types. For the correction of the faulty habits formed, pupils were given remedial instruction by the school psychologist over a period of ten weeks. Witty found that the identification of specific spelling difficulties in each child tended to overcome negative attitudes and proved to be incentives toward improvement. Other conclusions reached are as follows. "In the cases studied, aversion to spelling was universal." "Awareness of specific difficulties actuated the pupils to correct them. This spirit led to a change in their approach to spelling in general. The possibility of success in hitherto impossible tasks became evident, and out of the specific situations in which they saw underlying principles and real needs a lively interest developed." Substantial gains in spelling achievement were reported in each case. Teachers reported general improvement in spelling and neatness. Work in composition also showed improvement.

Assistance for pupils learning to spell, based on a study of spelling disabilities, is furnished by Gates (1928) in the following suggestions:

1. Careful articulation of the word is most important.
2. Careful observation plus visualization is helpful.
3. Syllabication is desirable.
4. Writing the word is the final purpose. The child must learn to spell while attending to the content.
5. The amount of repetition will vary from pupil to pupil and word to word.
6. The pupil should know the meaning of the word he is learning to spell.¹
7. Spelling rules should be used sparingly.

¹ From Gates's *The Psychology of Reading and Spelling with Special Reference to Disability*, page 84. Quoted by permission of the publishers, Bureau of Publications, Teachers College, Columbia University.

- 8 No form of word grouping has been found of value
- 9 Groupings by similitudes of errors are sometimes effective but seldom worth the trouble
- 10 Calling attention to special portions of words by underlining, colored letters, etc., has not been found generally useful.
- 11 Diacritical marks should not be used
- 12 An aggressive interest is essential
- 13 Learning to spell words in out-of-school activities should be encouraged

Results reported by other investigators indicate that not all these rules have been conclusively proved to be valid

For initial stages in spelling diagnosis any one of the standardized spelling tests may be used. Much of the material designed by Gates for testing difficulties in reading is also useful for the diagnosis of spelling disabilities.

THE CASE OF JIMMY

A fuller account of Jimmy has been given in Chapter VI as an illustration of a pupil in need of special study. Some time after the investigation already reported Jimmy was referred to a psychologist by his teacher, who wished to ascertain the reason for the boy's poor spelling. At the time, the boy was in the fifth grade and ten years of age. His speech had been much improved through the efforts of the specialist who had originally investigated the case.

He was given the following tests, with results as indicated.

	IQ	GRADE
Stanford Binet	120	
Stanford Achievement Reading		4.4
Morrison-McCall Spelling		2.6
A partially standardized spelling test of second- and third-grade level		2.6 (approx.)
Gates Graded Word Pronunciation Test		3.3 (approx.)
Gates Tests on Phonemic Ability		1.0 to 2.0
Gates Perception Tests, Words		2.0
Gates Selection Tests, Words		3.4

He was also given a letter to write from dictation, and his general written work was examined for the types of errors made.

The Stanford Achievement Test battery shows Jimmy to be weakest in word meaning and most capable in paragraph meaning. This would be expected from the nature of his difficulties shown on other tests. During the spelling tests Jimmy made every possible type of error. He had established no habitual methods of attack. In spelling he almost invariably got the first two or three letters of a word correct and then went completely astray on the rest, either inserting or omitting letters or inverting them. He had no notion of the spelling of many common phonograms, for example, "ed." He was unable to say the alphabet beyond P.

Jimmy is intelligent, quick at grasping things, and has a good memory. A very serious desire to improve in spelling was apparent. In view of these facts it seemed entirely possible that proper methods of instruction should bring about improvement in spelling within a short time.

One of the chief causes of Jimmy's spelling deficiency is his speech difficulty. The boy has formed the habit of changing the pronunciation of words to suit himself. The sounds which he tends to alter are naturally those on which he is most likely to stutter. The chief letter causing difficulty in both speech and spelling appears to be *s*. He says, for example, "dunner" or "danner" instead of "dinner." He shows difficulty in pronouncing words beginning with *c* and *r* following initial *s*. Jimmy does better in reading than in spelling because he is bright enough to get the meaning of a word from the context and does not need to examine each word carefully to get the meaning of the whole.

Remedial work in Jimmy's case is directed toward

1. Accurate word pronunciation
2. Improvement in distinguishing the sounds of words

and syllables, giving the sounds of syllables and phonograms spelled, and spelling sounds pronounced

3. Practice in word building
4. Practice in spelling words with silent letters

A year after remedial instruction was begun, the Morrison-McCall spelling test was repeated. The resulting grade score was 39, a gain of one and a third grades.

REMEDIAL WORK IN SPELLING

The teaching of spelling is a highly specific process. Remedial work in spelling is not accomplished by handing a list of words to a child with the command, "Learn these." Learning to spell the word "exquisite" will not help materially in learning to spell "February."

The following rules have been found helpful in individual instruction in spelling:

1. Pronounce the word. Be sure the pronunciation is correct.
2. Say the word several times in order to get its rhythm, an estimation of its length, and the number of syllables it contains.
3. If each syllable is spelled as it sounds, write the word and compare it with the original.
4. If the word is not spelled as it sounds, study the difficult parts. After studying the word, write the word.
5. Write the word in a sentence.
6. Results are better if the child does not attempt to spell the word orally until after these five steps have been taken.

Material helpful in remedial work and drill in spelling is contained in modern spelling textbooks. Among them are the following.

- Fundamentals of Spelling*, by ERNEST HORN and ERNEST J. ANSDAUGH
J. B. Lippincott Company, Philadelphia
- Growth in Spelling*, by E. L. THORNTON and JULIA H. WOLFARTH
World Book Company, Yonkers-on-Hudson, New York
- Individual Speller*, by CARLTON WOODBURN
World Book Company, Yonkers-on-Hudson, New York
- Junior High School Speller*, by RICHARD L. SANDWICK and A. T. RADON
D. C. Heath & Co., Boston
- McCall Speller*, by WILLIAM A. MCCALL and J. DAVID HOUNDER
Laidlaw Brothers, Chicago
- Morrison Speller and Work Book*, by J. CAVEY MORRISON
Irregular Publishing Company, Syracuse, New York
- Remedial Lessons in Spelling*, by NORMAN H. HALL
Hall and McCrory Company, Chicago
- Teaching Spelling by Plays and Games*, by S. A. COURTS
S. A. Courts, Detroit, Michigan
- Test and Study Speller*, by DANIEL STARCH and GEORGE A. MINICK
Silver, Burdett & Co., New York

Other devices recommended are

- One Hundred Spelling Devices*, by W. FRANKLIN JONES
Hall and McCrory Company, Chicago
- Self-Help in Spelling*, by JAMES E. McDARR
Plymouth Press, Chicago

FURTHER SUGGESTIONS FOR REMEDIAL WORK

Steps which characterize well-organized work with remedial cases are listed in the Twenty-fourth Yearbook of the National Society for the Study of Education. These are as follows: (1) the formulation of specific remedial measures which attack the causes of deficiency, (2) initiation of regular remedial work in a manner to enlist pupil cooperation and effort, (3) measurement with records, notes on pupil reactions, and study of progress, (4) adjustment of work to changing needs until the deficiency is removed, (5) frequent checks after improvement to insure continued growth.

In the opinion of Buswell (1887) much drill in arithmetic is fruitless because teachers do not understand the processes at work in the operations in arithmetic and are unable to discover the causes of pupil errors. Children are left to their

own devices since the formation of proper habits of work receives so little attention from the teacher. What is needed is not general teaching of processes but the working out by the teacher of methods suitable for specific instruction conducted with checks and controls.

The past few years have seen a rapid increase in the quantity and types of drill materials for the use of the pupil in his individual mastery of the skills. Workbooks and drill cards which give adequate drill on specific processes are helpful in correcting deficiencies in arithmetic. Commercial workbooks are not so useful for reading as for arithmetic. The reason is self-evident. Learning to read is a more complex process than learning the fundamental skills in arithmetic. The personal characteristics of the child play a somewhat larger part in the reading process than in the acquisition of number skills. The interplay of the personalities of teacher and pupil are more important factors in reading than in arithmetic instruction. In arithmetic, the methods are more straightforward and more easily determined in advance of the instruction program. In reading, the methods must be altered from day to day according to the needs and interests of the individual pupils. Material prepared for one child may be largely unsuited to another. The child's attitudes toward the reading process are so important as to demand the teacher's best effort to discover the attitudes present in the child to be instructed and through subtle suggestion to correct undesirable attitudes and install new ones. The rewards in learning the simpler processes of arithmetic can in most cases be more immediate for the child than in the case of reading. Progress is usually more readily discernible to the child himself in learning arithmetic.

Specialists in conducting diagnostic and remedial work in reading often find it necessary to construct suitable drill and instructional test material. The content of material in

readers may be useful but lacking in sufficient repetition and checking devices. In such a case the specialist or teacher adapts the materials to the needs of the particular case with which he is working. The use of a primer typewriter facilitates such work. Improvement in spelling, reading, and handwriting should be worked for at the same time if deficiencies in all are evident.

Principles of drill and the characteristics of worth-while drill materials have been listed by Schoaling and Clark and Potter, Knight, and Willing.¹ Drill directed toward increasing skill for economy in learning should be specific, individual, motivated, regular, systematic, and standardized — i.e., should have time and accuracy standards. It should reveal individual weaknesses, and aid diagnosis, provide for review, have transfer value for practical situations, and be organized in small units. From the standpoint of administering it should, in so far as possible, be self-administering and self-checking, applicable to a group situation, and economical from the standpoint of expenditure of time and money.

In remedial work the instructor should guard against giving the child the impression that the deficiency is abnormal and that the child is very different from other children. If it is necessary for instruction to be given apart from the regular classroom, it should be related to classroom activities as closely as possible, and the goal of remedial instruction should be to prepare the child for full participation in classroom activities as quickly as possible.

¹ Schoaling-Clark-Potter, *Instructional Tests in Arithmetic Teacher's Manual*. World Book Company, Yonkers-on-Hudson, New York, 1929.

P. B. Knight, "According to What Criteria Should Drill Be Organized?" in the *Third Yearbook of the Department of Superintendence*, pages 33-61. National Society for the Study of Education, District of Columbia, 1923.

Matthew O. Willing, *Practice Exercises in the Mechanics of Written English for the High School Teacher's Manual*. Teachers College, Columbia University, New York, 1922.

QUESTIONS AND TOPICS FOR FURTHER STUDY

1. What are indications that a child needs remedial work in a skill subject?
2. What are environmental factors that may contribute to poor school work?
3. Determine the IQ's and the EQ's of a class of children in the fourth grade. What is their relationship? In cases of extreme discrepancy point out the causal factors.
4. What would you conclude if 25 per cent of a group are in need of remedial work?
5. Are school-subject disabilities hereditary? How do you explain the situation of mother and son's having similar learning difficulties?
6. Can incidental learning be depended upon entirely for the training of pupils in the skill subjects?
7. How should the skills be introduced? Can the skills be made interesting? How? How early in the school life of the child should the skills be introduced?
8. How far should children's interests be permitted to determine school practice?
9. Select all the children having special difficulty in reading in a third grade. How many of such children are also having difficulty in other school subjects?
10. List all the factors which may be at the base of a case of reading disability discovered in the third grade. Make a study of a child with disability in reading, and tabulate all the factors which appear to be causal. Outline the diagnosis of the case, make a complete study of the child, and make recommendations for reteaching.
11. One child in the second grade makes excellent progress in art work, especially industrial art work, but he does everything he can to avoid reading and the reading lessons. What may be some of the factors involved? What should be done in such a case?
12. List all the types of reading difficulties found in the pupils of one school. List the difficulties in arithmetic.
13. Discuss the value of the alphabet or a highly phonetic method of teaching reading. What does progressive practice recommend?
14. Choose three tests useful in diagnostic work in reading or arithmetic. What are the characteristics that make them especially applicable to diagnostic work?
15. What are the limitations of much so-called "drill work" in skills?
16. What precautions must a specialist take in working with a disability case outside the classroom?
17. Under what circumstances is it fair to expect a pupil with disability in a skill subject to be brought up to normal grade standard after special remedial work?

CHAPTER EIGHT

PUPIL CLASSIFICATION

In progressive schools pupil classification is neither haphazard nor arbitrary. On the contrary it proceeds as the result of investigations of conditions most effective for group instruction, studies of pupil achievement and readiness for achievement, and predictions of pupil progress.

There are two major phases of pupil classification: (1) the placement or grading of new pupils, and promotion and regrading of pupils already in the school, and (2) the grouping or sectioning of pupils within a grade group if there are enough pupils to justify such grouping. Classification may also include the placement of pupils in special classes or schools and recommendations for the placement of pupils in state or private institutions if the necessity arises and facilities are available. The admission of pupils to kindergarten and first grade is a phase of classification.

In a one-room country school enrolling ten or a dozen children of different ages the need for formal classification is scarcely felt. This is equally true of the small private school with limited enrollment and instructors in the ratio of one to every ten or fifteen children. In the larger private schools and in large city school systems enrolling thousands of pupils classification becomes one of the school's major problems.

In most schools pupil grouping operates somewhat automatically. Children enter the first grade normally at about the age of six and continue to progress in school at the rate of a grade a year, provided their school achievement justifies the promotion. Otherwise they are retained in the grade for another term. In rare cases of exceptional achievement the child receives a double promotion. As a result the typical grade group includes children who are normal in age for the grade in which they are located, some who are overage for

the grade, and a few who are younger for the grade than is the average child. At the beginning of the term such groups in which only natural classification has taken place may be only roughly homogeneous with respect to readiness for the work of the grade, and they will be extremely heterogeneous with respect to chronological age, mental ability, and other factors.

Individual instruction has been proposed by some as the ideal plan for meeting the wide variety of individual needs of pupils in so far as the learning of the more mechanical phases of school work is concerned. On the other hand the proper grouping of pupils has been found to make for economy of learning and at the same time to foster cooperation and social intercourse in the child's daily activities in the classroom. Though grouped in classes, children can still proceed to acquire techniques at individual rates and to make individual adjustments. The problem in the larger schools becomes one of reducing the wide differences apparent in school children in such a way as to effect the greatest economy to the school system and the most satisfactory adjustment of the child.

CRITERIA FOR CLASSIFICATION

The possible bases for pupil classification are as numerous as the characteristics of the children to be classified. Some schools classify children according to physical size or the chronological age of the child, the number of desks in the classrooms, or the wishes of parents. Progressive educators consider the following criteria the most important for grade placement, grade sectioning, and promotion, although opinion varies concerning the weight to be accorded any one factor.

1. The pupil's probable rate of mental development or mental capacity
2. Level of mental maturity

- 3 Predicted progress in one or more of the skill or tool subjects — reading, arithmetic, spelling
- 4 Level of achievement reached in any one or more of these skills
- 5 Chronological age
- 6 Social and emotional maturity
- 7 Physiological maturity

The first four criteria may be determined either by subjective judgment or by the use of standardized tests. Both are useful when their reliability is high. These four criteria are usually expressed in terms of test results.

Rate of mental development or mental capacity is usually indicated by the IQ derived from an intelligence test. If 100 is considered average, a quotient of 75 indicates a slow learner and a pupil of comparatively low capacity. A quotient of 125 indicates a bright pupil and rapid learner.

Level of mental maturity is usually indicated by a mental age derived from an intelligence test.

Predicted progress in skills when measured by educational achievement tests is indicated by the educational quotient derived from such tests. Such a quotient indicates the pupil's probable rate of progress in acquiring such skills as reading, arithmetic, spelling. Because of a high degree of similarity between educational and intelligence tests, the resulting IQ's and EQ's for a particular child may be quite similar.

Level of achievement in a skill, when measured by educational tests, is indicated by an *age-level* or *grade score*. Such a score indicates the level reached in acquiring skill in a school subject.

Social and emotional maturity are estimated from observation of the pupil in comparison with others of his age, sex, and opportunity.

A pupil's physiological development is judged by skeletal

changes and other indices of maturation in comparison with those of pupils of the same age and sex.

Subjective judgments of each factor furnished by teachers and supervisors afford checks on the objective test findings.

THE USE OF THESE CRITERIA IN CLASSIFICATION

No one criterion or test result should be used as the sole basis for classification. The general rule may be stated that pupils should be placed in grades or groups in such a way as to reduce variations in chronological age, mental and educational status, and predicted rate of progress to a minimum. The larger the school system, the more possible becomes the realization of this aim.

The objection has been raised that when pupils are grouped homogeneously with respect to mental capacity or rate of progress in school work, they are likely to be greatly dissimilar in other traits. This is quite true. There is no way in which to group pupils so that they will be homogeneous in all respects. Since in the school room the leading purpose sought is progress in making group adjustment and in acquiring facts, skills, and mastery of concepts, it is important to give most weight to factors that contribute most to the realization of these aims.

In progressive schools there is a tendency to break down subject-matter barriers existing between subjects such as reading, history, language, and arithmetic, and to organize the curriculum in terms of units of work or centers of interest. In such a scheme it is more desirable that pupils be classified on the basis of ability to work together harmoniously and to contribute to the general project undertaken than it is to classify them on ability to progress in any one of the formal school subjects. In the progressive school acquisition of the several necessary skills can be provided for largely through individual drill. In a school situation in which there is little

grouping on a subject-matter basis it is best to group pupils homogeneously with respect to the most important factors making for success and progress in school activities in general, attempting at the same time to group children homogeneously on the basis of as many factors as possible.

The placement of new pupils is always a difficult matter, particularly if the pupil comes from a school system about which little is known. Difference in standards makes the appraisal of report cards difficult. New pupils should be given only temporary placement at the beginning of the term. If a pupil's placement is, from the start, considered as permanent, it is difficult to effect a change.

The same types of classes, the same weighting of criteria, need not prevail in the schools of the same system. The range of individual differences among the pupils will vary from school to school. Classification schemes must be adapted to the needs of the children to be classified.

The wishes of parents must be considered to some extent in the classification of their children, and at all times parents should be given the chance to express their opinions. There can never be satisfactory classification of pupils, however, if parents' opinions are given precedence over the judgments of school authorities. Although the parent has the child's welfare at heart, he actually knows little about children other than his own and seldom understands the theory of pupil classification. To take very seriously parents' whims and petty grievances will, in the end, militate against the proper classification of children for instructional purposes.

THE CASE FOR HOMOGENEOUS GROUPING

The chief problem confronting the educator is not the number of pupils to be dealt with so much as it is the great diversity in pupil capacity and achievement found in any unclassified group of pupils. Experiments have shown that

under certain circumstances much larger groups of pupils can be successfully handled than would otherwise be the case, provided the pupils are grouped as homogeneously as possible on the basis of probable rate of progress.

The pros and cons of homogeneous grouping have been much debated. The type of homogeneous grouping most discussed is that which divides and groups pupils on the basis of mental and scholastic ability, determined usually from the results of mental tests with or without the confirmation of teachers' judgments. It has been objected that such grouping has been adopted wholesale by many schools without preliminary experimentation. A study of the results of homogeneous grouping should unquestionably precede the adoption of the new basis for the classification of pupils. Such a study need not necessarily involve extended experimentation. Monroe (96) observes that experimental proof is lacking as to the value of homogeneous grouping, though he believes a number of arguments can be offered in support of it. From a study of the particular children to be reclassified, together with a consideration of the facts disclosed by previous experimental work on individual differences in achievement, the values or disadvantages of homogeneous grouping for any group of school children can be fairly safely inferred. Determination of the value of grouping is made difficult by changes in teaching practices, processes, and standards that go with change in organization and class management. The whole purpose of homogeneous grouping is to make possible changes in curricula and standards to meet the varying needs of pupils.

No one raises much objection to the segregation of potentially feebleminded school children. Their deficiencies are so gross as to require separate instruction. Experiment and experience have repeatedly demonstrated that segregation of these obviously misfit children is economical and humane.

The validity of the principle of segregating the less seriously deviate, atypical children of different types — including the dull, normal, and gifted — has not been proved so conclusively, and the proof is less welcome to many educators and most laymen.

Wallin (181) is of the opinion that "it is impossible scientifically or effectively to organize instruction in any large school system without segregating or grouping together pupils who are measurably similar either in respect to mental normality or mental abnormality." In harmony with this opinion he concludes: "The instruction of palpably abnormal with normal children is an injustice to both the abnormal and normal pupils and to the teacher, and can only be regarded as a survival of pedagogic barbarism."¹

As a result of investigation Kuhlmann has found in the ordinary school system in which children are not grouped according to any particular scheme as many as five different mental-age groups in a grade. The expectation of the school is that all the children are to accomplish the same work and to be able to pass to the next higher grade at the end of the school year. Children who are barely able to read a few monosyllabic words after three or four years of repetition are commonly found in regular classes with normal children.

The problem of homogeneous grouping raises the question as to whether in a democracy differentiation of instruction and the grouping of pupils for differentiated instruction is justifiable. Apropos of this question Burnham (364) remarks, "Democratic education consisteth not in the number or heterogeneous character of the children in a class, nor in having all children of a given chronological age study the same books at the same place and time, but in so adapting education to individual capacity that every child may have

¹ From Wallin's *The Mental Health of the School Child*, page 378. Quoted by permission of the Yale University Press, publishers.

the opportunity according to his ability to become superior in something, to the end that each may be able to give successful service in a normal social group"¹. The two sides of the question have been presented by Terman and Bagley in numerous publications. Terman believes that differentiation is necessary and justifiable. Bagley argues that differentiation of instruction and segregation may prevent the child selected as dull or subnormal from achieving as much as he might otherwise be capable of doing.

Symonds (114) has listed the objections that have been offered to ability grouping. Objections are that

1. Ability grouping is a form of educational determinism
2. The pupils may recognize the kinds of groups in which they are placed
3. Such grouping is undemocratic
4. The dull need the stimulation of the bright
5. Pupils often learn as much from the bright pupil as they do from the teacher

In Symonds' opinion experience has shown not one of these objections to be valid if the classification program is administered reasonably. On the contrary the objections indicate misconception of educational aims.

ILLUSTRATIONS OF EARLY CLASSIFICATION SCHEMES

As the result of experimentation in psychology during the past half century the necessity for the classification of children by some other means than random heterogeneous grouping or grouping by chronological age became apparent. Mass instruction and the rigid graded systems such as prevailed for a time and still prevail today in many communities were found to be grossly inadequate for the educational needs of the pupils. The "lock-step" resulted from the assumption

¹ From Bureau's *The Normal Mind*, page 274. Quoted by permission of D. Appleton & Co., publishers.

tion that all pupils could progress at the same rate. Among the schemes proposed to break this so-called "lock-step" in education were those providing for rapid advancement for the gifted and slower progress for the retarded, others provided for both these methods of differentiation in the same scheme. All the originators of the various schemes recognized the need for differentiation of instruction for pupils of different ability, though it was not always understood very clearly just what differences existed or what provisions should be made. Some of the schemes proposed going to the opposite extreme from rigid classification to completely individualized instruction.

Some schemes were designed to assist the slow pupil so that he could finish his course in the same length of time as other pupils. Examples of such schemes were the Arlington (Massachusetts) group plan, the Batavia system, and the Santa Barbara Concentric Plan.

Those permitting the precocious to advance at a faster rate than the slow, either through grouping or through schemes for individual instruction, were the St. Louis plan, the Cambridge plan, the La Mans (Iowa) plan, double promotion systems, double and multiple track plans, the Elizabeth (New Jersey) plan, the Baltimore scheme, the Newton (Massachusetts) plan, the Portland (Oregon) plan, and the Pueblo system.

One of the first criticisms of the lock-step in education was made by Jones (331). He presented numerous objections to the instruction of pupils in undifferentiated groups. Holmes (330), another early protagonist in the movement to individualize instruction, presented the facts that were then known about individual differences in children and the educational provisions which these differences imply. The report gives a summary of early attempts to provide for individual differences.

CLASSIFICATION SCHEMES PROPOSED FOLLOWING THE
INTRODUCTION OF MEASUREMENT

The measurement movement more sharply defined the mental and educational status of individual pupils and resulted in newer attitudes toward classification and in new classification schemes. Although the earliest school masters were conscious of the fact that children differed in their capacities to learn, they did not understand the full significance of these differences and the factors that caused them. Many other early educators were not concerned with individual differences but were interested primarily in the subjects they were attempting to teach. Whether or not some pupils fell by the wayside did not concern them greatly, on the other hand, the sooner the incompetents dropped out the better the situation for the teacher.

Classification schemes proposed, following the introduction of devices for measuring mental development and educational progress, were similar in many respects to older plans for pupil classification. There were, for example, new multiple-track plans, new schemes for individual instruction, and new provisions for special classes for exceptional children. For the most part these new schemes were different in direction and purpose. Individual instruction was not provided for the purpose of enabling children of different talents to make equal progress and the slow to "catch up" with the bright, but rather to enable each child to progress at his own individual rate. This meant differentiating rather than equalizing the educational progress of pupils. The advent of tests enabled the school administrator to determine with more exactness the rates at which different pupils could make progress, and to determine their readiness for more advanced steps in the acquisition of new techniques and information. New multiple-track plans were devised with the frank admission that there were differences in pupils which could

be best provided for in educational institutions by means of parallel classes in each grade division, enabling pupils to progress at different rates throughout the entire period of educational training. Such schemes were found to be less difficult to administer, and to achieve about the same results as individual-instruction schemes.

J. L. Horn (334) presents a diagram illustrating the way in which schools should be organized. His suggestion for school classification consists of a scheme whereby the children of each grade level will be divided into five sections on the basis of mental ability. Sections are provided for the feeble-minded, the dull, the average, the better than average, and the superior pupils. All these pupils spend the same length of time in the elementary grades.

Terman and his collaborators (118) suggest a multiple-track plan of school reorganization which provides simultaneously for different rates of progress for the pupils of different ability. They believe that provision should be made in separate classes for the superior, the bright, the average, the dull, and the subnormal. The first of these groups progresses at a faster rate than the others. The next three progress at about the same rate, and the subnormal pupils progress at the slowest rate of any of the three major groups.

Dickson and his collaborators (87, 118) report a scheme of reorganization and classification tried out in Oakland and Berkeley, California. The scheme of organization consists of a three-track plan which provides classes for the accelerated, normal, and limited pupils.

Several experiments have been made in the classification of first-grade pupils by means of mental tests. These experiments have been described by Lowell (333), Berry (336), and Dickson and Martens (69).

Pintner and Noble (333), Terman (336), and Torgerson (336) have reported results of classifying school children by

means of standardized tests and their conclusions from the results of such work. Pintner describes the classification of five hundred children in the first six elementary grades, showing graphs to illustrate the situation before and after reclassification.

A bulletin of the United States Bureau of Education (327) describes systems of homogeneous grouping and methods of classification. A list of cases in which a system of classifying pupils has been developed is included.

The classification of pupils in the schools of Jackson, Michigan, is described by Helen Davis in the Twenty-second Yearbook of the National Society for the Study of Education. The same yearbook gives a description of classification into ability groups of pupils in the schools of Detroit, Michigan.

Test Service Bulletin No. 4, issued by the Department of Research and Test Service of World Book Company, is entitled *How Should Pupils Be Classified?* It discusses principles of classification that utilize test results and explains the different functions of test results in classification.

A PLAN OF PUPIL CLASSIFICATION IN A PROGRESSIVE PUBLIC SCHOOL SYSTEM

The following plan of classification has been used successfully for several years in a public school system enrolling approximately four thousand children of an unselected American population.

The classification scheme employed in the elementary schools is similar in some respects to the usual three-track plan. Exceptionally gifted or deficient pupils are placed in separate groups. The selection of these pupils is made on the basis of combined educational and intelligence tests and opinion based on general observation. At suitable intervals surveys of intelligence and achievement of the entire pupil population are conducted, after which pupils ranking in the

lowest and the highest ten per cent of the population are reexamined with individual intelligence tests. From among these pupils the candidates for special groups of superior and deficient pupils are selected. For these groups classes are provided in each elementary school building. Transfer to such groups does not take place until adequate study of each child has been made and the parents have been interviewed.

All the rest of the elementary school population remain in regular classes. Pupils in special groups may progress more rapidly or more slowly than pupils in regular classes. The actual rate of progress varies with the particular group, and adjustments of the curriculum are made in view of the needs of each group. Pupils in regular classes may be further classified on the basis of general ability to progress, if there are enough pupils in any one class to justify the organization of more than one group.

Pupils who have reached their thirteenth birthday without graduating from the sixth grade are sent to an opportunity high school which is centrally located. Here the children are classified largely on the basis of mental ability. A few pupils are found in this group who are retarded solely because of illness or frequent transfer, but not because of mental retardation. Such pupils are prepared as quickly as possible for the regular junior high school. The majority of pupils in the opportunity high school remain there until they reach the age for leaving school. In this school much more opportunity is provided for industrial and household arts on elementary levels and for concrete experience than is provided in the elementary schools or in the regular high school.

In this scheme of classification no hard and fast rules are adhered to. The scheme is entirely flexible at every point, allowing for changes and adjustments as the need arises. Results from a particular test are not used as the only basis for grade placement or classification. Additional details in

the classification and educational provision for subnormal pupils in this school system are described by Riechel (334)

The success of this scheme has been proved by the retention of a larger number of overage pupils in school for a longer period of time than under systems used previously, and, in the opinion of the principal, by the better preparation of these pupils for life. The number of retarded children in regular classes has been greatly reduced. This classification scheme has also proved a time saver for the especially talented pupils. It has provided for greater homogeneity of pupil capacity in the regular classrooms. In this scheme fewer pupils fail of promotion than is ordinarily the case. Beginning pupils who are found to be mentally retarded are not required to struggle with reading and arithmetic before they are ready for such work.

The possibilities of individual instruction are not overlooked in such a scheme. In the past, many plans of individual instruction have been put into operation with little success. Such efforts have become more successful with the development of the project method, the invention of self-checking devices and drill materials, and the possibility of defining goals in terms of standardized test scores.

THE USE OF TESTS IN CLASSIFICATION

For purposes of classification and grade placement tests of intelligence and school subject achievement, special aptitude and disability, are most needed. Both group and individual tests are useful. Kelley (349) issues a warning that tests, in order to be used in the classification of individual pupils, should have a high degree of reliability. Few of our tests now meet this requirement, and errors may consequently be made in the placement of the individual pupils. The chances are, however, that there will be less error in the use of the better tests than in the use of teachers' judgments alone.

Before final classification other data are necessary. Errors will be avoided if the administrator or psychologist has at hand before the placement of new pupils the child's previous school record, the essential facts about his previous school history, physical history, mental and educational test records, and some information about the home background.

Initial classification must be considered only the starting point in the educational guidance of children. After classification has taken place, it should be followed up a few months later with an investigation of the success of the work. Frequent readjustments will be necessary to allow for initial errors and actual changes in the children themselves.

EVALUATING THE SCHOOL'S CLASSIFICATION SCHEME

An outline for the evaluation of city school systems on the basis of pupil classification has been devised by Engelhardt and his students (365). The use of this check list enables the administrators of the school system to appreciate more fully what is desirable in classification and to estimate the efficiency of the school system in providing for individual differences. The condensed outline is as follows:¹

- A. The program is governed by the following facts and principles:
 1. The school system is responsible for seeing that every child of school age is enrolled and attends regularly.
 2. The grading and promotion system should make the greatest possible provision for individual differences. This may be by variation of the time allowed to reach objectives, and of difficulty or number of objectives.
 3. Pupils differ in the degree of efficiency with which they can accomplish objectives.
 4. Children should be graded into homogeneous groups for the major part of their instruction.

¹ N. L. Engelhardt, *Outline for the Evaluation of City School Systems* (in mimeographed form). Quoted by permission of the Bureau of Publications, Teachers College, Columbia University, New York.

- 5 A limited range of mental abilities among individuals simplifies and improves instruction
- 6 Any individual should make progress in accordance with his capacity
7. School work should be so planned that every industrious normal child can "pass"
- 8 Groups should be so arranged that within a given time they are subject to as little change as possible, subject to change in the sense that change should take place whenever the needs of the individual pupil would be better served by his being placed in a different group
- 9 Ability to do the work of the grade to which he is assigned should be the basis of promotion, rather than achievement as measured by arbitrary standards of meeting arbitrary academic requirements of subject matter
- 10 Investigation has shown that the most important causes of slow progress in school are
 - a Low intelligence
 - b Course of study undapted to individual differences and to the interests of the children.
 - c Poor attendance
 - d Rigidity of classification and promotion system.
11. Twenty-five per cent of children in American schools have repeated one to four grades. This situation requires attention
- 12 A large proportion of children do not finish Grade Eight
- 13 The percentage of pupils over fourteen years of age retained by the schools is one measure of the holding power of the school.
- 14 The percentage of the entire school population that is in high school is a measure of the efficiency of the school
- B. Adaptation to individual differences is provided in several ways.
 - 1 Regulating the size of the classes. Classes are small enough so that children may have the necessary individual attention
 - 2 Adaptation of curriculum. Minimum essentials, average course, and enriched course are provided, depending on the ability of pupils
 - 3 Adaptation of teaching
 - 4 Adaptation of grading and promotion

QUESTIONS AND TOPICS FOR FURTHER STUDY

1. Compare provisions for pupil classification in a modern school with provisions of twenty years ago in a school of similar size.
2. Discuss factors which should be considered in pupil classification. Which of these factors should have most weight?
3. List information that you as a school principal would want for all new pupils entering from other cities.
4. Discuss the statement: *Homogeneous grouping is a sound educational procedure.*
5. Is it fair to classify beginning first-graders? On what grounds? In which grades is classification most needed?
6. What are the dangers in organizing a three- or five-track plan for grouping pupils? What are some of the practical difficulties involved?
7. What would be the difficulty involved in classifying pupils solely on the basis of IQ's?
8. What is the difficulty in classifying pupils solely on the basis of chronological age?
9. To what extent should pupils of varying ability be directed into pre-vocational, academic, or college preparatory classes?
10. Assuming that a school system in a city of 50,000 population has no formal classification program, outline suitable procedure.
11. What do you think of a classification program that provides for the placement of all pupils over thirteen years of age who have not reached the regular junior high school grades in a special high school where ample provision can be made for individual requirements? What are the advantages or disadvantages of the scheme?
12. Discuss the merits of the Winnetka scheme, of the Dulton plan.
13. Is it wise to classify a very dull child with brighter children who are younger? What are some of the difficulties and objections?
14. A foreign mother whose sickly daughter of twelve is making slow progress in the fifth grade says that she "will die of shame" unless the teacher helps the child enough so that she can go on to the sixth grade with her class. The mother is willing for the child to do home work after school in the afternoon and in the evening as well. The mother will see that the child does not have to spend time on housework. She is not willing that the child should play outdoors until all her home work is done. What should the teacher and the school do?
15. Which is better — to departmentalize work of the fourth grade so that children can be classified according to progress in different skills, or to organize the work around some central activities, grouping pupils on the basis of general maturity and providing for individual progress in skills?
16. Select a school with which you are acquainted. Check the efficiency of its pupil-classification program.

CHAPTER NINE

PSYCHOLOGICAL SERVICE FOR INSTRUCTION AND GUIDANCE

THE cooperation of teacher and psychologist facilitates the solution of instructional problems. In checking pupil achievement, in using instructional drill materials, in rating pupil achievement, psychological service is invaluable to the classroom teacher. Expert service for educational counseling and vocational guidance, for parent education, and for cooperation with social agencies is obtained through the employment of specialists with psychological training.

CHECKING PUPIL ACHIEVEMENT IN THE CLASSROOM

The use of standardized measurements in surveying pupil achievement has already been described. The classroom teacher has frequent need for informal tests and checking devices to measure pupil achievement. Such devices cover small units of subject matter and are closely related to progress with the curriculum. Their reliability and effectiveness are increased if, in their construction, the principles of standard test construction are adhered to.

A teacher in a progressive school recently received help from the school psychologist in the construction of a series of arithmetic tests. These tests were designed for use at frequent intervals in studying pupil progress in the mastery of the material as outlined in the course of study for the grade. Samplings were made of problems and questions in the arithmetic material for the grade, to be used as the basis of test construction. The teacher of a first grade also wished to test objectively pupil mastery of a primer used in reading instruction. A reading vocabulary test was especially needed. Using the vocabulary of the primer as a basis, a series of tests was prepared in mimeographed form.

Teachers of elementary school grades have daily need for instructional tests and drill materials based on sound psycho-

logical principles and applicable to the daily work of the classroom. Lists of such materials have already been given in Chapter VII. Most of the materials listed are equally applicable to pupils in need of remedial work and to pupils who make normal progress. It may be necessary to construct new materials to meet the needs of special classroom situations, particularly in the case of drill in spelling, handwriting, reading, and other skills.

The learning of the skills can often be accelerated through the use by pupil and teacher of graphic methods of indicating progress. Illustrations of graphs showing progress in the use of drill materials by the pupil are shown by Curtis in the Teacher's Manual that accompanies the Curtis Standard Practice Tests in Arithmetic,¹ and by Rugg (354) in his *Primer of Graphics and Statistics*. Such devices as the Schoeling-Clark-Potter Instructional Tests in Arithmetic² are available to indicate the progress of both the individual pupil and the entire class. A similar device is described in the *Strayer-Upton Arithmetics: Middle Grades*.³ Such devices are particularly useful in the upper grades when pupils construct their own graphs and observe their daily progress.

THE FORMATION OF DESIRABLE PUPIL STUDY HABITS

The pupil is the central factor in the study situation, consequently any attempts to correct study habits without investigating the pupil's habits of work and attitudes toward work will be ineffectual. Study is most effective when pupils are active rather than passive, when they can see progress as they work and can derive feelings of satisfaction from their efforts. Many pupils dislike to study for any of a number of reasons: (1) Studying is usually a solitary occupation.

¹ Published by the World Book Company, Yonkers-on-Hudson, New York.

² George D. Strayer and Clifford B. Upton, *Strayer-Upton Arithmetics*, American Book Company, New York, 1923.

(2) Children's real interests often do not coincide with the material they are required to study (3) Study is often imposed upon a child by authority (4) Others in the child's immediate environment may be doing as they please — playing, resting, or carrying on interesting projects (5) Fatigue or lack of evidence of progress or success often makes the child's attempts to study half-hearted and unpleasant

If the child is to learn to study effectively, he must be trained in attitudes which neutralize unpleasantness in study and conditions supplying the maximum satisfaction must be provided.

The principles of the laws of learning and habit formation can be presented in simplified form to school children with applications to their own study habits. There are five of these principles that deserve special consideration (1) The nature of the learning curve is fairly definite. Periods of slow progress followed by rapid progress are universal. Continued effort during periods of apparently little progress will repay the student later on (2) Activity rather than passivity results in the most effective learning. The student can often work out his own methods for making the reciting factor more prominent in his study (3) It is necessary to face difficulties squarely and to face reality. Daydreams, excuses, alibis, are forms of evasion. They indicate infantile rather than mature development (4) There is need for much repetition and regular practice if the highest skill is to be obtained (5) Effectiveness in studying can be improved through proper distribution of practice periods

The classroom teacher should utilize these principles in assisting the student to form proper habits. Learning curves can be plotted, and interesting drill devices, requiring maximum positive response on the part of the student, constructed.

A summary of all the factors which influence a pupil's study habits is given by Woodring and Flemming (191)

The major factors are ability to learn, ability in reading, achievement in special subjects, health, home conditions, conditions in school, the schedule of work, methods of work, and associates. Reeducation based on an investigation of these factors will increase the effectiveness of the pupil's habits of study.

Many pupils study more effectively after the mechanical processes needed in study have been improved. For these purposes materials to test speed and accuracy and improvement in the mechanics are helpful. Students in the higher grades assist the school in understanding their needs by keeping schedules of their daily routine with particular reference to study habits. Sturtevant and Strang (171) have described the use of schedules by high school students.

THE PROBLEM OF SCHOOL MARKS

School marks are used for two purposes. In the first place they furnish data for purposes of promotion and school record, and in the second place they give the parent some indication of the child's achievement in school work.

Most traditional school marks have been in the form of children's rank in order of excellence in the performance of school work, either in the work as a whole or in different subjects of study. These judgments have for the most part disregarded differences in the chronological age, background, or mental ability of the pupil. Usually within any one school a great diversity in standards of marking will be found, due largely to the subjective nature of the judgments made.

Attention has been called by Franzen (66) to the injustice of teachers' marks in groups which are not properly classified and not homogeneous as regards capacity and level of achievement. Report-card marks that indicate, without regard to differences in ability, the child's standing in accomplishment in school work in relation to that of other pupils in

the room indicate to parents the classification problems with which the school is confronted rather than the use that the child has been making of his time and ability

Informing the public of the diversity of ability in a single room would not seem to be the policy most helpful to the child. The teacher's rating of pupils in rank order to indicate diversity in their capacity or achievement so that the school may have an added check on other measures of such traits may have decided value for the administrators but can scarcely be of use to parents

FURTHER CRITICISM OF MARKING SYSTEMS

Since the invention and application of mental measurements traditional marking schemes have been subjected to much criticism. Mental measurements have demonstrated the possibility that children may be doing excellent work in view of their capacity but inferior work as judged by absolute rank among others in the same class. On the other hand children with unusual capacity to achieve may, though ranking high in absolute comparison with others, be doing only mediocre work. A rank order listing of the achievement of pupils reveals few of the really significant facts.

The chief difficulty with teachers' marks has been the lack of agreement concerning the bases of the marking system. Consequently there is no universality in the marks given.

The form in which marks are expressed and the distribution of the marks have been additional targets for criticism. In ranking pupils, about the best that any competent judge can do is to group children into five, or at the most, seven, groups on the basis of achievement in school work, mental ability, or any other trait about which the observer has information. Consequently most of the elaborate efforts of teachers to make finely graded distinctions between pupils

are worthless. Who can say what the difference between a grade of seventy-nine and a grade of eighty-one represents? What is the meaning of a passing mark of seventy and all the gradations above that mark which the teacher allots to the pupils? Marks expressed in terms of figures can never give more than a rough estimate of the ranks of the pupils, no matter how refined they may be. For this reason marks in the form of letter ratings designating groups of students in rank of accomplishment indicate all that is desired and all that is statistically valid in grading the achievement of pupils.

Another criticism of school marks is that the marks given are not distributed by teachers according to the laws of normal distribution of qualities and abilities. In a large unselected group of individuals traits of all kinds distribute themselves more or less roughly in the form of a symmetrical bell-shaped curve having certain fixed mathematical properties. A central tendency is distinguishable about which the scores of a large proportion of the pupils are closely grouped. Distributions of teachers' marks for even large numbers of pupils seldom approximate a symmetrical distribution. Therefore, if the group to be judged is very small or highly selected, a symmetrical distribution will probably not be found.

QUALITIES RATED BY SCHOOL MARKS

The types of teachers' ratings which are most helpful to the school for administrative purposes are the following.

1. Ratings of pupil ability, independent of achievement
2. Ratings of achievement in the work of the school, whether in different subjects of study or in the work as a whole.
3. Ratings of habits of work
4. Ratings of emotional stability
5. Ratings of contributions to social groups

- 6 Ratings of character qualities.
7. Ratings of a pupil's ability to plan and to execute his plans
- 8 Ratings of general information possessed by pupils
- 9 Ratings of progress in school work and personality traits over a given period of time with reference to status at the beginning and the end of the period
- 10 Interpretation of ratings of pupils in all these traits in comparison with those of normal or average children if the teacher has had sufficient experience with average pupils to make this comparison

Morrison (376) discusses the question of marking and describes the system in use in the University of Chicago High School. Pupils are marked on the basis of their achievement in relation to their capacity to achieve. This mark is combined with other ratings of development and achievement.

MODERNIZING THE MARKING SYSTEM

In revising its marking system, the school needs first to tabulate all the possible meanings that school marks may have — all the ways in which school marks may be expressed — and to decide which of the teachers' ratings are useful for the school alone and which are useful for parents. It should then decide to what extent supplementary information should accompany the report of marks to parents and to what extent interpretation is necessary.

In the elementary division of the Lincoln School of Teachers College, New York, the pupil is marked as satisfactory or unsatisfactory in meeting the requirements of the grade, the reason for any unsatisfactory achievement is indicated, and a list of desirable traits and habits is marked — and supplementary comments given — on the pupil's achievement with reference to these habits. With each report card the

parent is sent a list of the traits and habits marked, together with an explanation of the terms used and an explanation of the basis for rating them. For a fuller description of this card the reader is referred to *Curriculum Making in an Elementary School*, by the staff of the elementary division of the Lincoln School.¹

Teachers' marks usually take into consideration the marks that pupils make on classroom examinations. Consequently any means of improving the rating of such examinations will improve the final school mark. The marking system of nearly every school could be vastly improved from the standpoint of uniformity and validity. If school marks could be more completely standardized, the problem of interpreting the cards of new pupils from other school systems would be nearer solution.

A method of converting teachers' marks into absolute scale values has been described by McCall (89). The method is applicable only in a normal distribution.

EDUCATIONAL GUIDANCE AND COUNSELING

Counseling gains in importance as an educational function with increased attention to individual pupil welfare. Happy adjustment of the pupil both in his present environment and in adult society is often facilitated through counseling with someone who understands the child's abilities and weaknesses, who can give the pupil some indication of his academic and vocational expectations and help in organizing his program of activity so as to achieve them. Much of this counseling can be done successfully by the wise parent, but most phases of educational guidance can be carried on more skillfully and judiciously by teachers, psychologists, physicians, and the administrative staff of the school.

The most important periods for counseling and guidance

¹ Published by Gunn & Co., Boston.

are in the high school years. This statement need not imply that guidance is not a function of the elementary school. Educational guidance in the elementary school is largely provided for through pupil classification and provision for individual differences in achievement. The details of such work have already been described. In the high school guidance more generally takes the form of advice in courses to be followed, assistance in forming desirable work and study habits, and the improvement of social adjustments. The child's own point of view assumes greater importance in the high school than in the elementary grades. Consequently the interview as a guidance technique is more useful in the high school.

Educational guidance can be made more reliable through the use of psychological measurement. The fundamental requirement in tests for guidance purposes is measurement of mental ability, of educational achievement, and of special abilities or deficiencies. The *Seashore Measures of Musical Talent* are examples of useful tests in the field of special talent. The tests are used by several music schools in advising students as to their prospects in further music education.

VOCATIONAL GUIDANCE

Pre-vocational guidance and vocational guidance are functions of both the elementary and the high school. It has been pointed out that the real reason children leave school for industry is often not the economic necessity or the desire for work but more often lack of sufficient ability or incentive to do the work of the upper elementary and high school grades. Large numbers of pupils drop out of school at the end of the seventh or eighth grade, and they will continue to do so in spite of pressure to remain. There is consequently an urgent need for vocational guidance at the time these grades are reached. In several school systems

of the country extensive vocational guidance programs have been inaugurated. Among them are Chicago, Cincinnati, Detroit, and Pittsburgh.

Vocational guidance requires in addition to investigation of the pupil's general ability to learn and to adjust to new situations a study of his aptitude for the particular occupation he may choose to enter and his ability to acquire the new skills involved. Breakdowns occur when the employee cannot meet the demands of his occupation. Vocational guidance should always be preceded by educational guidance. If the educational guidance has been wisely given and is carefully followed by vocational guidance, the transition from school to industry will not be abrupt and the adjustments will in most cases be successful.

Both formal and informal tests have their place in vocational guidance. Informal tests are illustrated by the sort of thing every employer does when he interviews the prospective employee. The method of one employer was to ask a boy applicant to be seated and to write a composition on some general topic related to the work for which he was applying. The story is told of another employer who always tested a candidate for a position in the following manner. The employer would seat himself facing a sunny window without pulling down the shade. If the prospective employee pulled down the shade, the interviewer was satisfied that he was thoughtful, polite, intelligent, and would be a valuable addition to the concern.

The use of objective trade tests has undergone intensive investigation at the Vocational Adjustments Bureau in New York. The construction and use of such tests has been described by Treat (322). These tests are used with every individual referred for assistance to the bureau. An illustration of the kinds of tests used and the way in which results are interpreted was afforded in the case of Irene, reported in

Chapter VII. Work of this kind is a function of school psychologists and vocational counselors, and can profitably be engaged in by school systems enrolling large numbers of pupils who will leave school early for industry. A list of trade and clerical tests has been included in Chapter III. The list of personality tests and rating scales includes materials equally useful in vocational guidance. Objective tests never measure all the facts pertinent to vocational guidance and placement, but in many cases they furnish the only reliable information about an individual's aptitude for a future vocation. Many errors in vocational placement are avoided when pupils' aptitudes are studied by special methods.

The determination of intellectual limits for occupations is a problem for the research worker, but the application of the findings to the particular situation is the function of applied psychologists and vocational counselors.

Burr (317) has made a study of the intellectual requirements for an assortment of manual tasks. As the result of her investigation she lists the minimum mental age required for a variety of industrial occupations and refers to other research workers who have made similar studies. She observes that too much intelligence may be as much a handicap for certain occupations as too little intelligence is for others. As an illustration of her findings she has estimated the mental age necessary to slip a powder puff into an envelope. To fold and enclose a slip of paper with an object in a case requires a somewhat higher average mental age. There is, of course, much overlapping for different individuals in the degree of mental maturity required for a given task.¹

All normal children should be encouraged to remain in

¹ In a dissertation published by Teachers College, Columbia University, Vanuxem reports a study of the suitability of various tasks for feeble-minded women.

school as long as they benefit from classroom instruction. Specialization of interest and direct vocational or trade training should be delayed as long as possible. A system of education which encourages specialization and vocational preparation of the immature child is undemocratic. A breadth of experience rather than narrowing of the field of interest is desirable in the upper elementary and junior high school grades.

The qualifications of the vocational counselor have been mentioned by Leake (319). He suggests that the vocational counselor needs information about industries, experience in dealing with the individual, and should have a capacity for constructive research. He must know how to make records and tests of the individual and how to interpret them correctly. He must be capable of making and directing such research work and surveys as will keep him in touch with current movements.

PARENT EDUCATION

There is an increasing tendency on the part of the school to throw back the child's problems to the home. The school recognizes the futility of attempting to educate a child a few hours a day without reference to the child's activities and associations during the after-school hours. Probably 90 per cent of the problems which the pupils present in the classroom could be solved by better understanding on the part of parents of newer movements in education and the need for acquiring objective attitudes toward child behavior. Many parents wish to cooperate with the school but fail to establish the necessary contacts. Experts trained in psychological techniques are helpful in coordinating the work of the home and the school in child training. Psychologists assist in the organization of parent-teacher associations and study clubs, particularly when child study is made a leading activity of

such organizations. Mothers are usually glad to cooperate with the school in keeping diaries and making observations of child behavior, but such observations are of little value unless they are carefully supervised. The necessary supervision can be given by specialists trained in child observation.

Most parents are interested in the education of their children though they may lack technical knowledge concerning the process. The parent who refuses to cooperate or attempts to nullify the teacher's efforts is unusual. Nevertheless the "problem" parent who needs instruction from the school in child training and the development of helpful attitudes toward home and school problems occasionally appears. Among the problem parents most frequently encountered is the parent who expects the school to do the whole job, who sends the child to school hoping to be rid of the problem, who assumes no responsibility for habit training, the parent who wants the child to be taught as he himself was taught thirty years ago, usually with emphasis on the skills to the exclusion of all other learning, misunderstanding modern educational theory and practice, the parent who fails to recognize the child's limitations, sees no reason why the child is unable to learn as well as the other children, and has the child's whole career—including a college education—all mapped out for him, the parent who dominates his child's life so completely that the child is unable to develop independence, the parent who expects the child's difficulties to be corrected by the school and who holds the school responsible when the child does not improve within a short time. Informal talks between parents and school authorities, the publication of interesting leaflets presenting the school's philosophy to parents, and series of meetings for parents are measures most frequently resorted to in correcting misunderstanding.

An outline for child-study work has been prepared by the

American Association of University Women to be used by study groups connected with the association. The outline includes study questions and lists of readings on various topics of interest to parents.

One suggested program for parents of the younger children, which has been found to meet the needs of a group of mothers in one school, follows:

1. Modern methods of child study
 - a. Facts which must be included in the study of the child
 - b. Methods which will help to objectify observations of children
 - c. Habit rating scales, etc.
 - d. Application to individual pupils
2. Health habits
 - a. Child's daily routine
 - b. Establishment of habits
 - c. Problem of diet and rest
3. General problems of behavior
 - a. Habit formation
 - b. Discipline
 - c. Development of independence
 - d. Character training
 - e. Sex education
4. Emotional development
 - a. Levels of emotional maturity
 - b. Self-control
 - c. Fears — desirable and undesirable
5. Beginnings of primary education
 - a. Provision for individual differences
 - b. Beginnings of reading, language, and number work

A list of readings was prepared for the foregoing program by the director of the study group.

One phase of parent education includes the description of the school's efforts in the work of child study and child guidance. If parents are to cooperate in such work, they should be informed concerning the school's services and facilities for meeting parent problems.

Parents frequently ask for information about standardized tests and the use made of them by the school. Such requests must be met diplomatically. The results of the questionnaire sent to different school systems throughout the country show that in very few schools are the actual test results given to parents. The reason for the restriction is that the results need interpretation before they can be understood by parents, there are many possibilities for misunderstanding. Consequently it is not usually considered wise to give parents scores on the tests as freely as ordinary examination marks or school grades are given them. One parent, when told that her child's IQ was 100, exclaimed that she was glad to know the child had "perfect intelligence." In very exceptional cases parents may, of course, be as well informed about tests as the psychologist is and be able to make judicious use of technical information.

Most administrators find it much easier to discuss the achievement of pupils with parents when test results are available. The test results, which the administrator's opinion cannot alter, tend to make statements about the child objective and impersonal. It is possible for the administrator or psychologist to give the parents general information about the child's mental status and educational achievement without disclosing the actual test results.

In some cases administrators or psychologists must inform parents frankly of a child's ability or inability to succeed in school work and to make normal adjustments. Even in the more extreme cases it is usually not necessary to speak of test results in technical terms. Situations are frequently encountered in which the parent believes the child capable of much more than he is accomplishing in academic achievement, whereas the results of the school's observation would indicate the opposite to be more nearly true. The truth of the situation should be disclosed to the parent only by someone in

whom the parent has confidence. Usually the parent will appreciate the school's point of view, particularly if he is reminded that all children have capabilities in some direction although their capabilities are not always for the same sorts of achievement. The best student, it may be pointed out, is one who works up to capacity or achieves what he is capable of achieving. It may be suggested that some children with much ability along certain lines make little use of this ability because of lack of effort or interest. The injustice of forcing a child beyond his ability should be emphasized.

COOPERATION WITH OTHER SOCIAL AGENCIES

Child-study activities of the school should be correlated with activities of social agencies in the community. The school should establish contacts with child-welfare agencies throughout the country in order to advise parents and administrators concerning proper institutional placement of exceptional and problem children. A list of institutions caring for exceptional pupils is useful.¹ The school must be prepared to cooperate with the juvenile court, city hospital medical clinics, child hygiene bureaus, and charitable organizations in their work with problem pupils. It is especially important that psychologists be closely associated with the supervisory and administrative officers in the school system, as well as with the health department and the attendance officers, in order to synthesize child-study activities within the school.

QUESTIONS AND TOPICS FOR FURTHER STUDY

1. Determine the IQ's of all pupils who are having difficulty in school subjects in a junior high school. In what per cent of cases might the difficulty be attributed to poor mental equipment?

¹ Schools for exceptional children are listed in *A Handbook of Private Schools*, published by the author, Foster Sargent, 11 Beacon Street, Boston, Massachusetts, and *The Parents' Problem*, published by the Special Schools Association, New York. A number of state departments of instruction furnish lists of special schools and institutions in their respective states.

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2 The parents of a ninth-grade boy who is having great difficulty in school work are anxious for the school to prepare him for a leading university. What investigation should be made, and what educational program should be set up in view of the situation?

3 List the factors in addition to intelligence that contribute to school success.

4 List all the factors you can think of that are conducive to successful study habits. List the factors in the successful study of a history assignment. How can teacher and home contribute to the formation of the best study habits?

5 Check a local school for the adequacy of its provisions for educational guidance.

6 How can conflicts in vocations be avoided?

7 What facts must you know about individuals and occupations to give reliable vocational guidance?

8 Draw up a report card that will be equally fair to children of differing ability.

9 Construct a report card to be used in a progressive school in which full records are kept of pupil characteristics and accomplishments.

10 What are the maturations in such school per cent marks as 97, 94, and 84?

11 Obtain the marks given by different teachers to the same set of examination papers. What is the extent of variation?

12 How do the marks of teachers compare from room to room within the same school?

13 What advice should the school give to the different types of "problem parents" listed in this chapter?

14 What would you say to the parent who insists that his child, who is actually dull normal and is failing in his work, can do just as well as the best children in his class if he only tries and if the teacher succeeds in interesting him?

15 What would you say to the parent who wants his child taught nothing but the skill subjects with all the "frills" left out?

16 Describe situations in which revealing test results to parents would be helpful. List some situations in which disclosing such results to parents would not be helpful.

17 What would you say to a parent if you wished to convey the idea that his child had less than average mental ability and that you would recommend different standards and possibly special classes for him?

18 Recommend a school for a mentally subnormal child of nine who is still in the first grade.

19 List all the agencies in your vicinity interested in child welfare in any of its phases. How are the activities of these agencies integrated?

CHAPTER TEN

RECORDS, REPORTS, ADMINISTRATIVE DETAILS

UNLESS child-study data are tabulated, recorded, and filed in such a way as to be readily accessible to the school staff, they are of little use. Any number of instances can be cited in which all the facts about a problem pupil were ascertained, but, not having been recorded properly in permanent form, were lost to use within a short time. Unless future needs are constantly kept in mind, the importance of systematic record keeping may be overlooked. Genetic studies of children are particularly dependent upon careful records of all phases of development over a period of years. It is difficult to see how any worth-while contribution to this field of research can be made on a large scale unless more accurate data about school children are recorded in permanent form. Complete records of child behavior in even one school over a period of years would add appreciably to the study of child development.

Since standardized test results frequently constitute the most reliable source of information about the child's mental traits, the importance of recording all the facts obtained is obvious. Standardized test records should be kept as faithfully as records of school marks and credits earned.

Record keeping of attendance data has received undue emphasis. Information about attendance may necessarily be vital to the taxpayer or superintendent, but the record of a performance test will undoubtedly be of greater importance in the child's educational guidance five years later than a record of the fact that the child was in school on a particular half day.

RECOMMENDATIONS FOR RECORD KEEPING

School record-keeping systems are found to be extremely diverse in character. Little information about pupils is

kept in such form that comparisons of children in different schools can be made

Heck (143) has pointed out the impossibility of carrying on research with records as they are now kept in schools and has described methods by which child-study records may be improved. He suggests the greatest needs to be centralization, permanency or cumulativeness, and continuity. Duplicate records should be kept in a central record office to facilitate their use. Heck makes nine specific recommendations for a universal system of child accounting. These recommendations are as follows:

1. All data needed by the teacher for a better understanding of the child should be recorded and made cumulative.
2. Such data should be available to the teacher at all times.
3. The data should be in a compact unit and not scattered through several files in several offices.
4. The system must guard against irregularity in record keeping caused by the careless, incompetent, or uninterested teacher.
5. Provision should be made whereby lists of pupils entering given grades at the beginning of the year may be permanently kept on file.
6. Certain details, such as the day-by-day record of half-days' attendance, should not be kept on the pupil's cumulative record.
7. There would seem to be little justification for a central office card file in addition to a complete census file for an entire city. One such card should be so devised that it can serve both purposes.
8. There should be a definite relationship between the record form at the principal's office and the record form used by the central office or the census department.
9. Such a central office should have a "live" and a "dead" file. The first should contain cards for all the children enrolled in the city. The second should contain cards for all pupils who have been withdrawn.¹

¹From Heck's *The Study of Child Accounting Records*, pages 191-192. Quoted by permission of Ohio State University, publishers.

Heck suggests criteria for the selection of the appropriate items of information to be included in a record system and lists the most essential items which meet the criteria set up. Since no one system can possibly fit all situations, it is necessary for each school system to make such adaptations as are necessary after a study of the needs of the school.

TYPES OF RECORDS IN CHILD ACCOUNTING

Schools in which psychological service is carried on obtain more information about particular children than can possibly be tabulated on one or two brief and inflexible record cards. In such cases a more flexible kind of record system is needed. Complete historical and cumulative records for all pupils in the school, rather than for problem pupils only, is the ultimate aim. Complete records of the history of problem pupils as now kept by many schools have proved to be indispensable in the educational guidance and reeducation of such children.

Class lists of test results form one kind of record. These should not, however, take the place of individual pupil cumulative records. Within another year the pupil will be in a different class with a different group of children, and unless records have been filed in individual pupil folders or on individual cards, finding the facts for an individual pupil will be a cumbersome, time-consuming task. McAllister and Otis (158) consider the individual child to be the proper unit for child accounting and base a system of record keeping upon this principle.

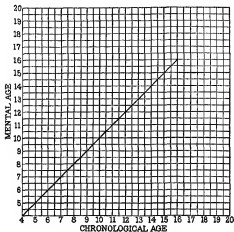
The following types of records have been found valuable both in public and private schools for recording child-study data. Not all the illustrations given here appear in the identical form in which the records are used, but a general similarity has been retained.

[illegible]

Form J. Record card for standardized test results.

CUMULATIVE RECORD OF STANDARDIZED TEST RESULTS										
NAME _____										
INDIVIDUAL TEST RESULTS							SUPPLEMENTARY TESTS AND RATING SCALES			
Test	CA	MA	IQ	Date	Grade	Teacher	Date	Grade	Name of Test or Scale	Interpretation
Notes							Notes			

Discussion of Form 1



TEST	DATE	CA	MA	IQ	GRADE	SCHOOL	EXAMINER

Form 3. Record of individual test results.

Achievement Tests have been used once a year, and the results in terms of reading, arithmetic, spelling, and total achievement scores are entered in chronological order on the card. A glance at the separate columns reveals the individual pupil's progress so far as the test results are concerned.

2. Form 3 shows a cumulative individual record of all individual intelligence test results. This card may be combined with the group-test record card if the backs of the record sheets are not desired for notations. The test results are entered in chronological order and the growth curve plotted at the time that the results are recorded. Individual intelligence tests are so commonly used today that the record may often be made more complete by requesting individual test results of schools the child attended formerly. These can be entered on the mental-growth chart. Logarithm paper is in some respects preferable to that used in Form 3.

3. A full report of the individual examination is provided for. A sheet used by the writer in recording the results of the Stanford Binet examination, useful also as a report to school administrators, is shown in Form 4. The child's characteristics observed during the test are included under "general impressions." All this information is typed on the record blank, and copies are filed in individual pupil folders.

4. A useful blank for recording the results of the Pintner-Paterson Performance Test is illustrated in Form 5. This type of chart enables the examiner to record and score the results almost automatically. This record too is filed in the individual pupil folder.

5. An illustration of a record sheet for recording pupil scores in one achievement test and for reporting the results to the principal is shown in Form 6. Such a sheet may be used in place of the individual pupil profile published with the test. A similar sheet could be prepared for any other achievement test battery yielding similar data.

6 An individual pupil profile or psychograph is shown in Form 7. Many types of profiles and psychographs have been constructed and described by psychologists and educational administrators. The first of the profiles appears to have been designed by Rossolimo (184), who published an account of it in 1912. He obtained the results of a large number of tests and scaled them in such a way as to make them roughly comparable. The result was a profile showing the various heights which the individual had reached in the different tests.

Trabue (183) has devised a record card, called the Educational Achievement Chart, to be used for the entire school period. The record is in the form of a psychograph, the column for each separate achievement being in the form of a thermometer on which the status of achievement in terms of school grade attained by the pupil is to be drawn in red ink.

Hollingsworth (889) has shown three good examples of the psychograph, one of which is circular rather than rectangular in form. Downey has designed a psychograph to be used with the Downey Will-Temperament Test. Abilities in the different traits are expressed in terms of deviation from the normal group in deciles. Lincoln (86) illustrates a graph for pupil performance in school subjects together with the pupil's mental and chronological age. This type of graph has been used in the Massachusetts Institution for the Feeble-minded at Waverley, where it originated.

Some of the difficulties encountered in the construction of psychographs have been pointed out by psychologists and statisticians. In the first place a psychograph cannot be constructed when the units of the traits measured are in different terms. Thus it is impossible to construct a graph showing the comparison between the amount of money a man has, his age, and his mental ability unless all these are

REPORT OF STANFORD BINET EXAMINATION

NAME	GRADE	DATE
CHRONOLOGICAL AGE	INTELLIGENCE QUOTIENT	
MENTAL AGE	EXAMINER	

GENERAL IMPRESSIONS

(Note adaptation to the test situation, social qualities, cooperation, special capacities, deficiencies, general mental capacity, motor control, coordination, handedness, speech, emotional reactions, inhibitions, effort, "drive," perseverance, interests, aversions. Record as much of the child's conversation as possible.)

first reduced to a common basis, usually in terms of the standard deviation of a large sampling of the population or in terms of percentile rank. The use of percentile rank is questionable since the units are not necessarily equivalent at all levels in the scale. Deviations in terms of the standard deviation of a normal group are useful for the construction of profiles, but at present there are few traits of which measures have been expressed in these terms. The task of constructing such scales is very great. Profiles may be made in terms of school-grade equivalents for test scores. If this practice is followed, many inaccuracies may result unless all the tests of the traits included in the profile have been standardized on the same or very similar groups of children.

The Stanford Achievement Test and the Public School Achievement Test, consisting of batteries of measurements in the school subjects which have been standardized for age and grade on the same groups of children, offer the possibility of some consistency in a profile showing the pupil's level in reading, arithmetic, and spelling at any one time. A blank for the construction of individual pupil profiles is published with each test blank. This is usually constructed in the form of a curve. A similar profile for an individual pupil in the form of a bar diagram is shown in Form 7. The mental age has been added to complete the record. Such profiles are useful when filed in individual pupil folders for future reference, since they show at a glance the pupil's relative standing in different kinds of achievement. The results for several years can be kept on one chart.

7. In order to systematize his work, the psychologist often finds it useful to require of administrators written notices about the children whom they wish to have examined. These may be in the form of individual or group record sheets and constitute a record, if properly annotated, of the examining carried on over a period of time. The psychologist should

PINTNER-PATERSON PERFORMANCE TEST RECORD

Name _____ Age _____ Grade _____ IQ _____ Examination _____ Date _____

Test	Time	Age											
		8	9	10	11	12	13	14	15	16	17	18	19
1. Maze fold	Time	110-20	90-57	60-50	40-45	44-39	30-35	24-33	32-31	10-20	10-20	20	27
2. Square	Time	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5
3. Five-Square	Time	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5
4. Three-Square	Time	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5
5. Circle	Time	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5
6. Square	Time	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5
7. Square	Time	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5
8. Square	Time	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5
9. Square	Time	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5
10. Circle	Time	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5

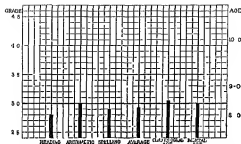
Scoring Record for Test 9 Pictus Comparison Test

Sum of Pictus	Max	Log	Broken window	Spring bird	Log	Log	Broken	Broken	Broken
Record									
Score									

Form 1. Pintner-Paterson Performance Test record blank. This form is adapted from one given on page 153 of *Scale of Performance Tests*, by Rudolf Pintner and D. G. Paterson. Used by permission of the publishers, D. Appleton & Co., New York.

NEW STANFORD ACHIEVEMENT TEST RESULTS					
NAME		GRADE		DATE OF TEST	
CHRONOLOGICAL AGE		INTELLIGENCE QUOTIENT			
MENTAL AGE		EDUCATIONAL QUOTIENT			
EDUCATIONAL AGE		ACCOMPLISHMENT QUOTIENT			
	AGE EQUIVA- LENT	GRADE EQUIVA- LENT	CLASS GRADE	MEDIAN EQUIVA- LENT	GRADE NORM
Total Reading					
Dictation					
Language Usage					
Literature					
History and Civics					
Geography					
Physiology and Hygiene					
Total Arithmetic					
Total Score					
Remarks and recommendations					

Form 6. Summary of achievement test results.



Form 7 Psychograph showing individual record on New Stanford Achievement Test

refuse to conduct examinations unless the persons requesting the examinations are willing to record what they want done. An example of this type of record sheet is given in Form 8.

8. Much useful information can be obtained from the home through the use of Form 9. This blank is similar to one used at the Lincoln School of Teachers College. The record could be readily adapted for use by any school in obtaining information about children. It can be used as an interview blank or as a questionnaire to be filled out by parents at home.

9. Other types of records are required which need not be illustrated. These include class lists, preferably typed in duplicate, of group test results. Copies of such lists should be filed in the different offices of the school where they are most needed. Rating scales and questionnaires used by the psychologist also constitute part of the child's record and should be filed in the individual folder. Case studies, and

Form 9 Pupil Information Blank

PUPIL'S NAME AGE BIRTH DATE BIRTHPLACE
 NAME OF PARENT OR GUARDIAN NATIONALITY
 ADDRESS OF PARENT OR GUARDIAN PHONE
 PARENT'S OCCUPATION Is the pupil an adopted child?
 Number of older brothers sisters younger brothers sisters
 Does the child have a nurse or tutor?

CHILD'S DEVELOPMENT AND HABITS

Age of walking talking (words) feeding self (spoon)
 Speech development average slow fast
 Has there been any stuttering or other speech defect?
 Is the child predominantly right- or left-handed?
 Eating habits regular irregular
 Describe pronounced food likes and dislikes

Does the child eat very slowly? rapidly? at an average rate?
 Must he be urged to eat? Does he enjoy his meals?
 What are his sleeping hours? Is sleep restless? Quiet?

SCHOOL PROGRESS

SCHOOLS AND GRADES ATTENDED

GRADE	DATE	SCHOOL	LOCATION	PROGRESS	
				Satisfactory	Unsatisfactory
Preschool					
Kindergarten					
Grade 1					
2					
3					
4					
5					
6					
7					
8					
9					

Does the child show any interest in particular vocations?

What are your plans for the child's future education?

PERSONAL CHARACTERISTICS

Does the child seem happy?

Has he good habits of work?

Does he work and play well with others?

Is he shy or easily embarrassed?

Does he pay attention as well as the average child of his age?

Can he concentrate as well as most children of his age?

DISEASE HISTORY

(Check the diseases the child has had)

Diphtheria

Mumps

Scarlet fever

Nervous conditions

Measles

Heart affections

German measles

Frequent colds

Influenza

Tonsillitis

Chicken pox

Whooping cough

Other diseases or complications

Unusual experiences Has there been anything unusual in the child's past experience that has influenced his present mental or physical condition or his development, e g, conditions of birth, shock, operation, accident, severe illness?

Have you observed any nervous habits such as thumb-sucking, bed-wetting, twitching, and the like?

Are there any pronounced family characteristics which it might be well for the school to know about?

Do you consider the child's general mental and social development satisfactory for his age? If not, what appears to be the difficulty?

Signed

Date

. .

records and reports of diagnostic and remedial work should also be written out in careful detail and preserved along with the other records.

10 The rating of pupil traits and achievements by teachers at different stages in pupil progress should be included in the child's total school record. Such ratings should be on a threefold or fivefold basis, preferably the latter, either in letter ratings — *a, b, c, d, e* — or numerical ratings — 1, 2, 3, 4, 5. The ratings should be based on observation of specific traits of child behavior which might all be classed under broad headings such as the following: habits of work, language usage, social qualities, health knowledge, general information, science information, social science information, intelligence, skills in tool subjects, skills in the fine arts, creative ability in different fields. The ratings can be in terms of pupil excellence as compared with other pupils in the grade or in terms of pupil normalcy with reference to the performance of a large number of pupils of the same age or grade. Illustrations of rating devices are the New York Rating Scale for School Habits,¹ the Haggerty-Olson-Wickman Behavior Rating Schedules,¹ and the Terman Scale for Ratings of Physical, Mental, Social, and Moral Traits.² Other recommended materials are listed in the Bibliography at the end of the book. Such ratings should be made only after thorough acquaintance with the child. They should be made without regard to objective test scores. Such records should not only constitute part of the record sent to parents but should become part of the permanent record of the school. Daily records of observations of young children are kept in a number of nursery schools and kindergartens.

¹ Published by World Book Company, Yonkers-on-Hudson, New York.

² This scale appears on pages 523 to 529 of *Mental and Physical Traits of a Thousand Gifted Children* (Genetic Studies of Genius, Vol. I) (1916).

REPORTING RESULTS OF PSYCHOLOGICAL SERVICE

In addition to the keeping of careful records of child-study data, the psychologist's functions include the making of reports of the activities he has carried on. Reports of this work are needed by the principal of the school, by school physicians and other specialists in the school system as well as by the teachers. The superintendent or director should have an annual report of the work carried on by the psychologist's department. The nature and frequency of the reports made will depend upon the facts to be presented and the individual or group to whom the facts are to be reported. This is equally true of the form in which the report is made. Reports of all phases of child-study work must be formulated in terms that will be intelligible to the persons to whom the report is made. Written reports of even the simplest kind are superior to oral ones when the report is not intended for group presentation or discussion. The written reports form part of the record of the work accomplished.

If psychological service is new to the school system, a bulletin should be prepared at the beginning of the year setting forth the aims of the work and its relation to the activities of other departments in the school system. Such a bulletin should be placed, early in the school year, in the hands of all staff members who are in any way to be connected with the psychologist's activities.

A bulletin (*16*) of this type has been published by the Lincoln School to acquaint the staff members and others with the activities carried on in the field of measurement. The topics include the aims of the work and the organization of the activities undertaken. The Lincoln School bulletin contains the following topics: the administration of testing devices, the employment of test results in pupil classification, intensive study of problem pupils, diagnostic and remedial

work in the fundamental processes, supplementary coöperative activities, records and reports, research. Illustrations of record forms, charts, and pupil profiles are included.

Similar bulletins have been prepared by psychologists and research directors in a number of school systems, including those of Detroit, Fort Worth, Los Angeles, and San Diego. Such a bulletin is distinct from the annual report, to be made to the superintendent or director at the end of the school year, in which is included a résumé of the work of the year and recommendations for the following year.

The psychologist should make reports of all standard testing programs for which he has been responsible. Such reports should be in the form that will interpret the findings most clearly and effectively. Reports of measurement projects and surveys are needed by the classroom teacher, the principal, the superintendent. The same type of report will usually not suffice for these different members of the school staff. The teacher requires a report of her own group. The principal needs a report for the entire school. Supervisors and superintendents usually wish reports for several schools or for the entire school population. They are generally interested not so much in the relative standing of individual pupils as is the teacher or principal, but rather in the standing of classes or schools as a whole.

Occasionally the taxpayer and the school patron may wish to know the results of testing programs in terms of total class or school accomplishment. Reporting the results of measurement to the public in intelligent fashion will be advantageous to the school system and assist the public to a better understanding of some of the newer methods in education.

The psychologist will also find it necessary to report to teachers and others the results of work carried on with problem pupils and diagnostic and remedial work in cases of disability. In this instance the records kept by the psychologist

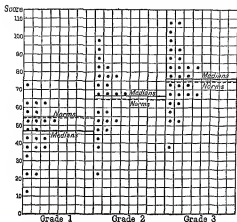


Fig. 1. Chart showing class distributions of pupils' scores on a standardized test. Each dot represents a pupil's score.

or specialist, when put into suitable form, may constitute the report as well as the record. If the psychologist has carried on special investigations of any kind, these too should be reported to the proper authorities.

PICTURING THE RESULTS TO BE REPORTED

Many reports are more effective when the salient facts are presented in the form of charts or graphs. A number of writers have described different varieties of pictorial representations for presenting educational data. Brinton (338), McCall (360), Alexander (337), and Williams (361)

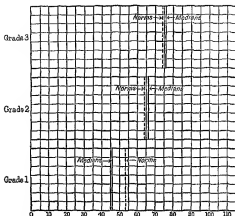


Fig. 2. Diagram showing frequency distributions in a test. Each child's name may be written in the appropriate square.

have described graphical representation of educational facts and methods of graph construction. Williams presents the purpose and value of charts and describes the construction of bar diagrams, circle representations, curves, frequency surfaces, block diagrams, picture graphs, and other types of pictorial representation. Many of these suggestions are applicable to the types of reports prepared by the psychologist or measurement specialist.

Methods of showing test results in graphic form are illustrated in Figures 1, 2, and 3. Figure 1 shows the scores made by pupils in Grades One, Two, and Three in a particular

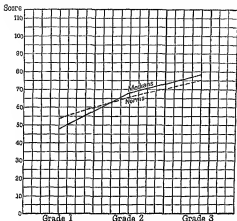


Fig. 3. Chart showing medians of pupil scores and norms for the test. The pupils' names may be entered in place of the dots if the report is designed for teachers, principals, or others interested in the relative standing of individual pupils. Otherwise small red stars or fictitious names will suffice to show the separate scores on the test. The medians and norms are placed on the chart in red and blue pencil. Such a chart constructed for all the grades in which a particular test has been given shows the standing of individual pupils in the test and the amount of overlapping from grade to grade.

A second form of this type of chart is given in Figure 2. In this chart blocks are substituted for the dots of the foregoing chart, and the pupils' names, if desired, may be written

in the blocks. Medians and norms are shown as in Figure 1.

Figure 3 dispenses with all indication of individual pupil results and shows only the central tendencies and norms for the three different grades. Such a chart is useful when only central tendencies need to be pictured.

Other types of reports which the psychologists may have occasion to present in chart or graphic form are age-grade distribution tables, overlapping in different traits of the pupils in different schools, overlapping and differences in various traits for boys and girls, the relation of mental ability to achievement, percentage distributions for groups in different traits, the distribution of mental ages of children at each chronological age for different classes or schools. Illustrations of many of these charts are to be found in textbooks in measurement, education, and psychology.

In the construction of graphs, maximum economy of time and effectiveness of presentation are desirable. In graph construction simplicity, clearness, and proportion must be the chief aims. Too much time should not be spent upon the construction of graphs that are to serve a temporary purpose only. Graphs can usually be constructed more quickly, easily, and effectively with colored pencil than with ink, and such graphs will serve the same purpose as more elaborate graphs made with special drafting instruments.

There are several different ways of duplicating handmade graphs. Tracing, blueprinting, photostating, mimeographing, and hectographing are the most commonly used methods. If the charts are to be shown to groups of persons and visual presentation on a large scale is desirable, lantern slides of the graphs to be shown constitute an effective method of presentation.

STATISTICAL METHODS IN THE TREATMENT OF
CHILD-STUDY DATA

There are minimum essentials in the statistical treatment of pupil data with which every psychologist should be acquainted.

The essentials of statistical knowledge needed by psychologists and educational specialists are stated by McCall (88), Otis (352), and Rugg (354). The latter believes that what psychologists most need is automatic certainty in the administration of the more commonly used statistical measures, and for the rest, adequate reading knowledge.

What are the most common statistical devices with which the psychologist should be acquainted? To determine the answer to this question further study is needed of the activities and the research work in which psychologists engage in their work in schools. From such a study the frequency with which certain statistical devices are employed could be determined. This point is discussed by Whipple and Davis in *Problems in Mental Testing* (126).

The psychologist makes frequent use of statistical methods in the measurement of capacities and achievements of pupils and in research work in which test results are used. Consequently any manual of testing in which the statistical treatment of results is described will contribute to the psychologist's knowledge of the essentials of statistics needed in his work.

Buckingham (339) states that the statistics most commonly needed in education are computations of averages, measures of reliability, of variability, and of relationship. These include computations of the arithmetical average, the median, the mode, Q, percentiles, standard deviation, average deviation, probable error of measures, probable error of estimate, the reliability of differences, rank order correlations, zero order correlations by the Pearson products moment method, and for test construction the determination of the reli-

ability and scaling of tests. The technique of multiple and partial correlation should be understood by the specialist who expects to carry on extensive research. Knowledge of the method of computing contingency coefficients is also sometimes needed by the research worker. Computation of the experimental coefficient and application of the T-scale method of scaling tests described by McCall (88) are useful to research and test construction. The psychologist should be acquainted with the properties and construction of the frequency curve. A workbook affording practice in the educational applications of statistics has been compiled by Greene (70). Other texts in statistics are listed in the Bibliography at the end of the book.

The incorrect use of the method of averages is one of the most frequent sources of error in the use of statistical method. The same thing is true of the interpretation of probable error and standard deviation. The correct interpretation of coefficients of correlation is often difficult for novice and expert alike. The beginner, it is true, often fails to see any difficulty in the interpretation of correlation coefficients unless he is cautioned in advance. The general tendency on the part of the novice to attempt to prove causal relationships from correlation coefficients is another danger in the path of the unwary. Errors involved in the use of percentiles are frequently overlooked.

Courtis (347) urges an investigation of the appropriateness of statistical methods employed by the investigator. Whipple (300) lists and discusses some of the errors most commonly made by investigators of educational problems. These include

1. Inaccurate arithmetic
2. Failure to compute the reliability of the differences of medians and averages and the differences between medians and averages.

- 3 Failure to forecast the number of observations necessary to establish correct conclusions
- 4 Claiming the same predictive value for two curves showing the same distribution
- 5 Failure to include qualitative as well as quantitative interpretation of the data

A number of common errors in the use of statistics are also listed by Burks and Kelley (340)

LABORATORY EQUIPMENT

The psychological laboratories found in the more progressive schools are reserved solely for psychological service and are appropriately equipped. The minimum requirements for room space are office space for the clerical staff and the record files, private space for psychological examinations, and private space for the psychologist or director of the work. The school authorities consider it just as important to provide adequate, light, well-ventilated testing rooms as to provide sanitary quarters for the health department. Psychological service is important enough to justify proper room provisions for it. It is equally necessary to provide the psychologist with space where private conferences may be carried on with children, parents, staff members, and specialists. Such space should be large enough for small group conferences.

The equipment includes comfortable chairs, desks, tables, rugs and pictures, modern filing cabinets, and cupboard and bookshelf space for books, tests, and other materials. A study of the record-keeping needs of the school determines the types of filing cabinets to be installed. Long, shallow drawers are necessary for the filing of large charts and graphs. For some purposes visible filing systems are most efficient.

Both used and unused test blanks are kept in cupboards or drawers appropriately labeled so that the needed blanks may

be quickly found. Testing equipment such as form boards and box tests are also kept on labeled shelves, all the materials properly classified.

Useful items of equipment consist of a drawing board with a few drafting instruments, and a display board with several leaves to which graphs and charts may be tacked. Rooms provided for examination purposes should be light, cheerful, and attractive. Tables and chairs should be of the right height. Drinking water and toilet facilities should be readily accessible, and funny papers, attractive books, or games should be used to serve the same purpose as do the magazines in the dentist's office in diverting the attention of children waiting to be examined.

For holding all the child's papers a pocket or envelope is sometimes better than a folder. A double-decker folder of the type included in the McAllister-Otis Child Accounting System (168) is useful when there are cards and papers of different sizes to be filed.

The psychological laboratory maintains a file of representative standardized tests. This file is kept preferably in the office of the psychologist or research director. Such files contain sample copies of the test manuals, scoring keys, norms, and supplementary information about the tests. Only with such a file at hand is the psychologist properly equipped to give exact information about tests and able to advise others in their use. Test bibliographies and circulars describing new tests are also kept on file.

ADDITIONAL EQUIPMENT AND OFFICE PROCEDURE

A number of mechanical devices facilitate the psychologist's work and are on hand in every well-equipped laboratory. A list of devices of proved value for statistical computation follows:

Monroe, Burroughs, Marchand, and other types of computing machines

Calculating tables such as those by Crelle, Peters, Barlow, Holzinger

Slide rules of the ordinary type and those for the computation of quotients in which twelve rather than ten is the basis of division. Of the latter type are slide rules constructed by Weus, Kohs, Bently, and Kuhlmann and Anderson

IQ computation tables The *Inghs Intelligence Quotient Values* published by World Book Company is an example

Age computation tables The *Baltimore Age Calculator* published by the World Book Company is an illustration

Correlation charts and percentile computation charts Such charts have been prepared by Kelley, Otis, Toops, Symonds, Ruger, Stenquist, Wood, and others

Card sorting machines (if there is enough work to justify the expenditure) An automatic test administering and scoring machine has recently been devised by Pressley A machine which scores and at the same time tabulates the number of correct answers for each question has been devised by Wood

The psychologist's office should have an adequate library of books on measurement and subjects related to the psychologist's activities. Among the latter should be the most useful books on the following subjects: general psychology, educational psychology, abnormal psychology, child psychology, educational measurements, statistics and graphics, the psychology of the school subjects, and material relating to diagnostic and remedial work. There should also be descriptions of the technique of case study and references on the psychology of problem children. The psychologist will find particularly useful a file of drill materials, workbooks, and

instructional tests in the school subjects. A file of special schools and institutions is always helpful. Bulletins and magazines relating to different phases of the work should be at hand if they are not already on file in the school system. All this material should be accessible to staff members who wish assistance in their work.

The psychologist or director plans in advance as fully as possible the activities to be carried on during the year. The time available for the work is distributed in such a way that all the activities to be carried on may receive their due share of attention. All engagements of importance are listed. If a list of the different tasks to be completed is kept and each item checked on the list as soon as it is completed, the work remaining to be done is more easily noted. If these lists are filed after all the work is completed, they will form a convenient record from which to make the annual report.

In so far as possible a daily account of the tests given, the conferences held, the visitors seen, the clerical work completed, will be helpful. Such a record forms a basis for time allotments and for making recommendation of further assistance needed or changes in policy to be instituted.

AN ILLUSTRATION OF A PSYCHOLOGIST'S DAY

The following outline illustrates the daily activities on an ordinarily busy day of one psychologist employed in a progressive school.

MORNING

Examination with the Binet test of a child applying for admission.

The administration of group tests to a small group of absentees who missed the test during the recent testing survey.

Conference on a problem child in the high school.

Conference on a problem child in the elementary school.

Answering correspondence and making requisitions for the tests to be used in the next survey.

Afternoon

Completion, for the principal, of reports of a group of seventh-grade children whose achievement was found to be deficient on recent tests

Further work on the construction of reading and arithmetic readiness tests for the primary grades

Instructions to an assistant for making a set of flash cards for diagnostic work in reading

Partial diagnosis of the reading difficulties of an upper elementary grade pupil

Study of the reading progress of a French child who had recently entered the school

Conference with a high school teacher

This day began at 8.30 and closed at 5:45, with half an hour's recess at noon.

On another day the work consisted more largely of routine matters. Activities which occupied most of the time included summarizing data for a school survey, completing a card file of all varieties of tests, selecting from this file a list — requested by a staff member — of tests suitable for kindergarten children, assisting a college student in measuring the reactions of individual pupils with a psycho-galvanometer, conferring with parents regarding a suitable school for a child with borderline intelligence and making up a list of suitable schools for the child, conferring with a teacher concerning the construction of a new achievement test, measuring with experimental tests perceptive abilities and information possessed by kindergarten children

The rank order of activities engaged in by the same psychologist, arranged according to the amount of time consumed in their performance during the year, is approximately as follows

1. Conferences with school staff members, parents, visitors, psychologists in training.
2. Individual testing of pupils

- 3 Group testing
- 4 Test scoring.
- 5 Tabulation of results and the construction of graphs and charts
- 6 Diagnostic work with individual pupils
7. Research including test construction and conferences with staff members conducting research

QUESTIONS AND TOPICS FOR FURTHER STUDY

- 1 Devise a set of record cards for an elementary school of five hundred pupils, keeping in mind particularly the recording of pupil-information data. Compare your cards with published forms.
- 2 Think of a particular school situation and list all the facts that should be kept by the school on a cumulative record throughout the child's school history. What material should be kept in individual pupil folders in a central office?
- 3 See how much information you can gather from school records about any five eighth-grade pupils. Are these data adequate for educational and vocational guidance purposes? for research purposes?
- 4 Tabulate all the data now kept on permanent records for individual pupils in one school system. How adequate is the material?
- 5 Outline a booklet or bulletin describing measurement and child study activities in the school.
- 6 At the beginning of the school year measure the mental maturity of first-graders in one school and make a report of results with tables and graphs.
- 7 Make a report of retardation in a school system with suitable tables and graphs.
- 8 Make a distribution of school marks for an eighth-grade class.
- 9 From the results of mental and educational tests make a graph showing a pupil profile.
- 10 After giving a mental or educational test to a class of forty pupils, make suitable graphs to show individual differences and central tendencies.

CHAPTER ELEVEN

RESEARCH PROBLEMS

CLOSE contact between schoolroom activities and the findings of the research laboratory is beneficial both to instruction and to educational research. Educational research underlies progressive practice. Continued investigation of child nature and development are desirable and justifiable in any program of child study.

In conducting research, children cannot be handled like guinea pigs or flies under the microscope. One of the essential differences between experimental work as carried on with school children and experimental work in the physical sciences is that in educational work the end result or the effect on the child must always be taken into consideration. This fact places certain limitations upon educational research. The study of school children also differs from research in the physical sciences because of the difficulty of controlling variable factors in behavior. In spite of these limitations there still remain possibilities for important research in child behavior.

Formerly the opinion of so-called authorities constituted almost the sole basis for the formulation of educational principles and the determination of educational procedures. The application of the scientific method to education has resulted in objective and unprejudiced investigation of all the factors involved in the instruction of school children.

Two characteristics of the scientific method as applied to education are (1) the use of objective methods in making observations of school children, and (2) the use of controlled experiment in determining the value of specific educational procedures.

RESEARCH DEFINED

Monroe (351) defines research in the following statement: "The ultimate purpose of all educational research is the discovery of procedures, rules, and principles relating to the various aspects of education. Critical reflective thinking is required in which the discovered facts and principles may be utilized as well as the original data. Thus the answering of any question about education by means of critical reflective thinking based upon the best data obtainable may be called educational research."¹

Research which involves the finding of facts solely cannot in the strict sense of the word be considered research. Research must involve the use of facts in drawing interpretations and generalizations. The discovery of principles and worth-while or useful generalization is the distinguishing characteristic of research.

The distinction between research and service functions in education can be illustrated by examples taken from the actual work of the school. To find out how much money is spent in the school system so as to inform the patrons or the board of education is not research. To find out the facts for the purpose of investigating problems connected with school expenditures might properly be called research. To take measures of the height and weight of school children in order to correct cases of malnutrition cannot be considered research. To obtain such information for the purpose of studying the general problem of malnutrition in children or to investigate the laws of physical growth would be considered research. The use of the facts obtained does not necessarily imply research unless it leads to further knowledge and important generalizations. The chief difference, therefore, between

¹ From Monroe's *Reporting Educational Research*, page 8. Quoted by permission of the University of Illinois, publishers.

research and service functions lies in the purpose for which information is sought. Practical and research purposes may often be realized simultaneously.

If educational research is to be of greatest benefit to the school system, it is important that it be organized from the point of view of the needs of the school system rather than from the point of view of the university expert interested in a particular problem. It is necessary that officers and teachers in school systems undertake to a greater extent than has been possible in the past the study of problems relating to the nature of the child and the influence of different educational methods upon him. One of the chief values to be derived from research in the schools is the new appreciation of scientific child study shown by teachers and administrators.

The studies of Martens (21) and Chapman (6) indicate that service rather than research occupies the attention of the so-called research bureaus. Any research activities carried on are usually due to the private enterprise of staff members. The results of the questionnaire sent to public and private school systems indicate that on the whole very little research work is carried on by the schools responding, that research is a comparatively minor activity in the present-day school system, that any research work engaged in is usually conducted by university specialists.

In order to feel a need for research, staff members must recognize the existence of educational problems requiring research activities for solution. Interest in research activities can be stimulated through enlisting the cooperation of the staff in research projects and demonstrating the advantages to be derived in terms of improved instruction. Large projects in educational research require organization. The research bureau established as part of the school system is the logical center for research activities.

SUGGESTIONS FOR CONDUCTING EDUCATIONAL RESEARCH
AND EXPERIMENTATION

Trial and error in research can be reduced through adherence to a few rules derived from the experience of investigators. Some attempt has been made to base procedure on the methodology of the other sciences. Assistance in planning experiments, in collecting data, in summarizing and writing up results, and in preparing bibliographies may be obtained from a number of reliable sources.

McCall (350) describes the methodology of educational experimentation and includes illustrations of the application to specific problems of the techniques described. He offers the following practical suggestions for conducting research: (1) Define and state the problem. (2) Describe the appropriate method. (3) Obtain reliable data. (4) Do not draw untenable conclusions. (5) Get enough cases for reliability.

Gates observes that in educational research and experimentation we need adequate controls, a complete written description of what was done, and complete measurement of the results obtained.

A bulletin prepared by Monroe (361) assists the experimenter in thinking through research problems and in writing reports of research. Similar publications have been prepared by Alexander (337), Crawford (343), and Good (346).

Educational research which undertakes the investigation of child nature and development, the value of different methods of child training, and the like, is largely dependent upon descriptions of child behavior in objective terms. For this reason the use of objective measurement in research work has become increasingly important. Ruch and Stoddard (108) observe that objective measurements are particularly useful in educational research through furnishing an objective basis for use in equating groups and for measuring educational products.

In the investigation of research problems the psychologists and child-study specialists take leading or minor parts, depending upon their interests, equipment for the work, and time available. For the most part the psychologist's activities in research are directed toward obtaining reliable information about children for the measurement of both initial status and final outcomes in controlled experiments and in other studies requiring accurate pupil data. The psychologist who has ability to initiate and carry on independent research should be given every opportunity to do so.

EDUCATIONAL PROBLEMS NEEDING INVESTIGATION IN WHICH
THE SERVICES OF PSYCHOLOGISTS CAN BE UTILIZED

The value of different methods of reading is subject to much discussion. Is the alphabet method or the larger thought-unit method the better for economy in instruction in beginning reading from the standpoints of the mastery of techniques and the formation of good habits of appreciation? Such a question cannot be answered by opinion merely. Experimentation of the most rigid sort is necessary.

Both service and research functions are performed in test construction. The many steps leading to the completion of a successful test require extensive research by specialists with training in psychology and educational methods. Outside of university centers and research bureaus in the larger city school systems test construction receives little attention. The principles of test construction should be more widely understood so that a larger number of persons possessing ability and original ideas but lacking technique can assist in the general improvement of measurement. The construction of educational measurements in particular should proceed simultaneously in a larger number of school systems in connection with curriculum construction and revision.

For a discussion of the principles of test construction the

reader is advised to consult the publications of Orleans and Sealy (99), McCall (88), Ruch and Stoddard (108), Otis (858), Monroe (96), Symonds (114), and Thorndike (119)

Other problems for educational research related to child study may be classified under four headings:

- 1 Studies relating to the characteristics of children
- 2 Studies relating primarily to the educational treatment of children
- 3 Research in methods of observing and studying children
- 4 Study of the general application of psychology to education

Suggested studies which belong to the first classification are the following:

- 1 The differences between bright and dull children in all traits and developmental characteristics
2. A study of children with high mental ability and poor school achievement
- 3 Comparison between delinquent and normal children in all traits
4. Similarities and differences in the reactions of children of the same mental level but different capacity
- 5 Case studies of psychopathic children and problem pupils
- 6 The relationship between intelligence and success in school work
- 7 Sex differences in intelligence and accomplishment in school work
- 8 The extent to which special abilities are still apparent, when training is equalized.
9. The nature of the curve of growth for mental traits.
- 10 The nature of learning curves for school subjects.
11. Children's emotional reactions to tests.

- 12 Emotional reactions of children of different age and ability groups
- 13 The development of number concepts in young children.
- 14 The development of language usage in young children
- 15 The correlation of intelligence with character and emotional qualities
- 16 Objective studies of children's interests
- 17 Relation of mental capacity to creative ability

Studies of the second type, those relating primarily to the educational treatment of children, include the following.

- 1 The amount of overlearning and overteaching going on in the school
- 2 Study of reading outcomes in terms of development of appreciations, imagination, emotional responses
- 3 Regular attendance and good health as factors in success in school work
- 4 The age at which children should be taught to read and write
- 5 Economical means of forming efficient study habits
- 6 The application of psychological principles in age and grade placement of curricular materials and the determination of the suitability of methods of instruction
- 7 Manuscript versus cursive writing in the primary grades
8. The effect of acceleration of bright children.
9. Comparisons of nursery school and kindergarten trained children with other children lacking such training
10. Factors causing school failures and retardations
- 11 The size and kind of type best suited to the introduction of written language in the school
12. Home study of school children with assistance of

adults in the home amount and kinds of work, conditions for work

- 13 Effect of motivation on school work
- 14 Pupil interests and their influence upon school work
- 15 Dynamic factors in school work
- 16 Correlation between prognosis of pupil success in school work and actual results achieved
- 17 Economical methods of teaching skills
- 18 Construction of appropriate materials for pupil instruction.

Research problems of the third type, relating to research in methods of observing and studying children, include the following

1. The development of objective techniques for measuring some of the so-called less tangible results of formal education, such as the development of appreciations, concepts, attitudes, feelings
- 2 Further work with rating scales for the rating of character qualities
- 3 Further comparisons of scores on group and individual examinations
- 4 The development of more reliable non-language tests, and comparisons between verbal and non-language tests
- 5 Further development of prognostic tests
- 6 The intercorrelation of tests which purport to measure the same or similar traits
- 7 Restandardization and extension of the Binet scale. Critical study of test items.
- 8 Further study of the validity of standardized tests

Research problems dealing with a study of the general application of psychology to education include the following

- 1 The functions of child-study specialists in education
- 2 The contributions of psychology to the study of the delinquent and the problem child.
- 3 The place of measurements in the school program
- 4 The activities of child-study bureaus and psychological clinics in the public schools
- 5 The education of parents in child training

In the field of curriculum research the services of psychological experts are greatly needed. The growing emphasis upon the child as an acting agent in the educational process has necessitated more attention to the needs of the child and emphasis upon the psychological rather than the logical arrangement of educative materials.

From the psychological point of view some of the factors to be considered in curriculum construction are the problem of differentiation of procedures and instructional materials for bright, dull, and average children, provision for different rates of progress on the part of individual children in the acquisition of the skills and in school work generally, possibilities in the unification of the child's activities as contrasted with the division of his activities into subject-matter compartments, the validation of the choice and arrangement of materials in view of children's interests and needs, determined for the most part objectively.

Specialists in psychological service contribute to the work of curriculum construction in the school system chiefly through experimentation to determine the needs and interests of children and the effects of different educational procedures.

QUESTIONS AND TOPICS FOR FURTHER STUDY

- 1 What are the chief difficulties encountered in doing research with human subjects as compared with those encountered in doing research in the physical sciences?

2 What are some of the ways of insuring the applications of research to educational problems?

3 Should research personnel be strictly limited to those who have had extensive training and experience?

4 List precautions to be taken in educational research. Are experts justified in claiming that most of what passes as research is not worthy of the name?

5 Criticize several published studies on the basis of adequacy of controls, suitable selection of subjects, objectivity of data, freedom from bias in collection and interpretation of data, tabulation of data, statistical treatment, form of presentation, bibliography, description of method.

6 Choose two research problems from the list on page 254 and outline a technique for studying each of these problems.

7 List other research problems relating to child welfare, mental measurement, individual differences, pupil classification, and instruction, the study of which would have important implications for education.

8 How can research and experimentation be of most assistance in curriculum construction? What are some problems of the curriculum that need extensive investigation by research methods?

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BIBLIOGRAPHY OF SELECTED TESTS AND SCALES

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TESTS OF INTELLIGENCE AND MENTAL DEVELOPMENT

Test	Grades or Ages	Publisher
Army Group Intelligence Examination - Alpha	Upper elementary — adult	C H Stodding Company, Chicago
Army Group Intelligence Examination - Beta (for illiterates)	Upper elementary and foreign-speaking adult	C H Stodding Company, Chicago
Benton and Stodfield Speech Measurements	All	C H Stodding Company, Chicago
Chapman and Welles Junior and Senior High School Classification Test	0-12	Dobson-Evans Company, Columbus, Ohio
Cole-Finney Test for Beginners in the First Grade	Primary	Bureau of Educational Measurements and Standards, Kansas State Teachers College, Emporia, Kansas
Dearborn Group Intelligence Tests: Series I Series II	1-3 4-9	J B Lippincott Company, Philadelphia
Dearborn-Anderson Form Board Nos. 1A, 1C, 2, 3, 4	Elementary	Harvard Psycho-Educational Clinic, Harvard University, Cambridge, Massachusetts
Detroit First-Grade Intelligence Test (Bogel)	Primary	World Book Company, Yonkers-on-Hudson, New York
Detroit Intelligence Test Primary Test	2-4	Public School Publishing Company, Bloomington, Illinois

Detroit Kindergarten Test (Individual) (Baker-Kaufman)	Kindergarten	World Book Company, Yonkers-on-Hudson, New York
Ferguson Form Boards- Nos 1 to 6	All— through college	C H Steeling Company, Chicago
General Developmental Schedules	Preschool	C H Steeling Company, Chicago
Goddard Revision of the Binet Scale (Individual)	Ages 8-13	C H Steeling Company, Chicago
Goodenough Intelligence Test (Drawing a man)	Ages 4-11	World Book Company, Yonkers-on-Hudson, New York
Gunnison Primary Test A	1-3	State Normal School, Gunnison, Colorado
Hagerty Intelligence Examination:		
Delta 1	1-3	World Book Company, Yonkers-on-Hudson, New York
Delta 2.	3-9	C H Steeling Company, Chicago
Hedy Pictorial Completion Test II	All	World Book Company, Yonkers-on-Hudson, New York
Herring Revision of the Binet-Simon Tests (Individual)	All	Public School Publishing Company, Bloomington, Illinois
Holley Picture Completion Test for Primary Grades	1-3	Bureau of Publications, Teachers College, Columbia University, New York
I E R Intelligence Scale CAYD- Levels A, B, C, D, and E	All	Public School Publishing Company, Bloomington, Illinois
Illinois General Intelligence Scale (Monroe-Buckingham)	3-9	C H Steeling Company, Chicago
Kelley Constructive Ability Test	All	Public School Publishing Company, Bloomington, Illinois
Kimbury Primary Group Intelligence Test	1-4	C H Steeling Company, Chicago
Kohn Block Design Test	All	Warwick and York, Inc., Baltimore
Kuhlmann Revision of the Binet-Simon Tests	All	

TESTS OF INTELLIGENCE AND MENTAL DEVELOPMENT (Continued)

Test	Grades on Area	Publisher
Kuhlman-Anderson Intelligence Tests	All	Educational Test Bureau, Minneapolis, Minnesota
Muller Mental Ability Test	7-college freshmen	World Book Company, Yonkers-on-Hudson, New York
Myers Mental Measure	All	Newton & Co., New York
Myers Postman Group Intelligence Test	1-6	Newton & Co., New York
Multi-Mental Scale (McCall and Others)	3-8	Bureau of Publications, Teachers College, Columbia University, New York
2 National Intelligence Tests Scale A and Scale B	3-8	World Book Company, Yonkers-on-Hudson, New York
Otis Group Intelligence Scale - Primary	1-4	World Book Company, Yonkers-on-Hudson, New York
Otis Group Intelligence Scale - Advanced	5-9	World Book Company, Yonkers-on-Hudson, New York
Otis Self-Administering Tests of Mental Ability	4-9	World Book Company, Yonkers-on-Hudson, New York
Intermediate Examination	9-adult	World Book Company, Yonkers-on-Hudson, New York
Higher Examination	3-8	World Book Company, Yonkers-on-Hudson, New York
Putnam Non-Language Mental Test	3-8	World Book Company, Yonkers-on-Hudson, New York
Purlier Rapid Survey	3-8	World Book Company, Yonkers-on-Hudson, New York
Purlier-Cunningham Primary Mental Test	Primary	World Book Company, Yonkers-on-Hudson, New York

Picknet-Puterson Performance Scales	Elementary	C H Steeling Company, Chicago
Port Scale of Performance Tests (Arthur)	All	C H Steeling Company, Chicago
Porteus Maze Tests	Elementary	C H Steeling Company, Chicago
Preseay Mental Survey Test	1-3	University of Indiana, Bloomington, Indiana
Preseay Mental Survey Scale	3-12	University of Indiana, Bloomington, Indiana
Preseay Primary Classification Test	1-2	Public School Publishing Company, Bloomington, Illinois
Intermediate Classification Test	3-7	
Senior Classification Test	7-12	
Rhodes Island Intelligence Tests (Bird-Craig)	Ages 3-6	Public School Publishing Company, Bloomington, Illinois
Standard Revision of the Binet-Simon Tests (Terman)	All	Boughton Miffin Company, Boston
Stinchfield Speech Measurements (for the handicapped)	All	C H Steeling Company, Chicago
Stuteman Merrill-Palmer Performance Tests	Preschool	C H Steeling Company, Chicago
Terman Group Test of Mental Ability	7-12	World Book Company, Yonkers-on-Hudson, New York
Town Picture Game Test	Primary	C H Steeling Company, Chicago
Triaba-Stothbridge Manimeter Tests (In Measure Year Mind, by M R Triaba and F B Stothbridge)	All	Douglas, Doran & Co., Inc., Garden City, New York
Wallin Peg Boards	Preschool and primary	C H Steeling Company, Chicago
Wilmer Cylinder Test	All	C H Steeling Company, Chicago
Worcester Form Boards (Shalov-Kent)	Elementary	C H Steeling Company, Chicago
Yerkes-Bridges-Hardwick Point Scale for Measuring Mental Ability	All	Warwick and York, Inc., Baltimore
Young Slot Maze A	4-9	C H Steeling Company, Chicago

COMPOSITE TESTS

Type	Grades or Ages	Publisher
Illinois Examination (Monroe-Buckingham)	5-8	Public School Publishing Company, Bloomington, Illinois
Examination I	6-8	Bureau of Cooperative Research, Indiana University, Bloomington, Indiana
Examination II	7-8	Bureau of Cooperative Research, Indiana University, Bloomington, Indiana
Indiana Composite Achievement Test		Bureau of Cooperative Research, Indiana University, Bloomington, Indiana
New Stanford Achievement Test.	4-8	World Book Company, Yonkers-on-Hudson, New York
Primary Examination	4-8	Bureau of Educational Research, University of Illinois, Urbana, Illinois
Advanced Examination	6-8	World Book Company, Yonkers-on-Hudson, New York
Oswego Achievement Test (Oswell)	4-8	Bureau of Publications, Teachers College, Columbia University, New York
Otis Classification Test	Elementary	C. H. Stoddard Company, Chicago
Putnam Educational Achievement Test	Elementary	Public School Publishing Company, Bloomington, Illinois
Putnam Mental Survey Tests	Elementary	University of Illinois, Bloomington, Indiana
Pressey Attainment Scales	Primary	Public School Publishing Company, Bloomington, Illinois
Pressey Scale of Attainment: No. 2	8	Public School Publishing Company, Bloomington, Illinois
Public School Achievement Tests	Elementary	Public School Publishing Company, Bloomington, Illinois
Stanford Achievement Test. (See New Stanford)	Elementary	Public School Publishing Company, Bloomington, Illinois

ENGLISH AND LANGUAGE

Test	Grades on Axis	Persons
Broad-Frederic Scale for Measuring the General Merit of English Composition in the Sixth Grade	6	F S Bredt, University of Chicago
Boggs English Form Test	7-8	Bureau of Publications, Teachers College, Columbia University, New York
Canine Dictionary Test	Elementary and high school	Elmer W Carins, Illinois State Nor- mal University, Normal, Illinois
Charters Diagnostic Language Tests	3-8	Public School Publishing Company, Bloomington, Illinois
Charters Diagnostic Grammar Tests	7-8	Public School Publishing Company, Bloomington, Illinois
Clapp Standard School Tests in Correct English	4-8	University of Wisconsin, Madison
Clark Letter Writing Test	6-12	Public School Publishing Company, Bloomington, Illinois
Franssen Diagnostic Tests in Language	3-8	Bureau of Administrative Research, University of Cincinnati
Ginsberg-Ingis English Essentials Tests	7-12	University Printing Company, Minneapolis, Minnesota
Guller Diagnostic and Remedial Test in Penmanship	6-8	Rand McNally & Co, Chicago
Halligan Scale for Measurement of English Composition	Elementary	Bureau of Publications, Teachers College, Columbia University, New York

ENGLISH AND LANGUAGE (Continued)

Test	Grades or Ages	Publisher
Holley Sentence Vocabulary Scale. Series A	3-8	Public School Publishing Company, Bloomington, Illinois
Series B	7-12	World Book Company, Yonkers-on- Hudson, New York
Hudson English Composition Scale	4-12	Ginn & Co., Boston
Ingls Tests of English Vocabulary	High school	Bureau of Publications, Teachers College, Columbia University, New York
Kelley Completion Exercises	2-12	Bureau of Educational Research and Service, University of Iowa, Iowa City
Larby Grammar Test	7-12	World Book Company, Yonkers-on- Hudson, New York
Lewis English Composition Scales	3-12	Plymouth Press, Chicago
McDada Language Grammar Test	4-12	Bureau of Publications, Teachers College, Columbia University, New York
Nassau County Supplement to the Halligas Scale	4-12	Public School Publishing Company, Bloomington, Illinois
New York English Survey Tests	4-8	Public School Publishing Company, Bloomington, Illinois
Pressley Diagnostic Tests in English Composition	High school	Public School Publishing Company, Bloomington, Illinois

<p>Section-Pressay Minimal Essentials Tests in English Composition</p> <p>Starch English Grammar Test</p> <p>Starch English Vocabulary Test</p> <p>Starch Grammatical Scale A: Punctuation</p> <p>Thorndike Extension of the Hallgas Composition Scale</p> <p>Thorndike Test of Word Knowledge</p> <p>Traub Completion Test Language Scales</p> <p>Tressler English Minimum Essentials Test</p> <p>Van Wagenen English Composition Scales</p> <p>Willing Scale for Measuring Written Composition</p> <p>Wilson Language Error Test</p> <p>Wisconsin Sentence Recognition and Grammatical Correctness Tests (Leonard)</p>	<p>3-6</p> <p>7-12</p> <p>5-12</p> <p>5-12</p> <p>4-12</p> <p>4-9</p> <p>3-12</p> <p>3-12</p> <p>3-through college 4-9</p> <p>3-12</p> <p>7-12</p>	<p>Public School Publishing Company, Bloomington, Illinois</p> <p>University Cooperative Company, Madison, Wisconsin</p> <p>University Cooperative Company, Madison, Wisconsin</p> <p>University Cooperative Company, Madison, Wisconsin</p> <p>Bureau of Publications, Teachers College, Columbia University, New York</p> <p>Bureau of Publications, Teachers College, Columbia University, New York</p> <p>Bureau of Publications, Teachers College, Columbia University</p> <p>Public School Publishing Company, Bloomington, Illinois</p> <p>World Book Company, Yonkers-on- Hudson, New York</p> <p>Public School Publishing Company, Bloomington, Illinois</p> <p>World Book Company, Yonkers-on- Hudson, New York</p> <p>National Council of Teachers of English, Chicago</p>
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MATHEMATICS

Test	Grades or Ages	Publisher
Breschner Diagnostic Tests in Fractions	5-8	Educational Test Bureau, Minneapolis, Minnesota
Breschner Diagnostic Test in Whole Numbers	5-8	Educational Test Bureau, Minneapolis, Minnesota
Buckingham Scale for Problems in Arithmetic	3-6	Public School Publishing Company, Bloomington, Illinois
Burrell-John Diagnostic Tests for Fundamental Processes in Arithmetic (Individual)	Elementary	Public School Publishing Company, Bloomington, Illinois
Clapp Standard School Tests. Number Combinations Compass Diagnostic Tests in Arithmetic (Ruch and Others)	2-8	University of Wisconsin, Madison
Compass Survey Tests in Arithmetic	Elementary	Scott, Foresman & Co., Chicago
Courtis Standard Research Tests. Series A and Series B	Elementary	Scott, Foresman & Co., Chicago
Courtis Supervisory Tests in Arithmetic	3-6	S. A. Courtis, Detroit, Michigan
Denver Curriculum Tests in Arithmetic	4-8	S. A. Courtis, Detroit, Michigan
Form Diagnostic Computation Scale	2-8	Public Schools, Denver, Colorado
Horace Mann Diagnostic Tests	Elementary	Catholic Education Press, Washington, D. C.
Johnson Self-Diagnostic Tests in Arithmetic	Elementary	J. B. Lippincott Company, Philadelphia, plus
Los Angeles Diagnostic Test	Elementary	Rand McNally & Co., Chicago Research Service Company, Los Angeles, California

Leicester Number Tests	Elementary	Kansas State Teachers College, Emporia, Kansas
Minneapolis Primary Arithmetic Test	3-4	Board of Education, Minneapolis
Monroe Diagnostic Tests in Arithmetic	Elementary	Public School Publishing Company, Bloomington, Illinois
Monroe General Survey Arithmetic Scales	3-8	Public School Publishing Company, Bloomington, Illinois
Monroe Standardized Reasoning Tests in Arithmetic	4-8	Public School Publishing Company, Bloomington, Illinois
New Stone Reasoning Test in Arithmetic	4-9	Bureau of Publications, Teachers College, Columbia University, New York
Orleans Algebra Progress Test	7-9	World Book Company, Yonkers-on- Hudson, New York
Our Arithmetic Reasoning Test	4-12	World Book Company, Yonkers-on- Hudson, New York
Post-Deartorn Progress Tests in Arithmetic	3-8	Houghton Mifflin Company, Boston
Post-Deartorn Progress Tests in Arithmetic New Series	1-6	Houghton Mifflin Company, Boston
Philadelphia Diagnostic Test in the Fundamentals of Arithmetic	4-7	Division of Educational Research, Public Schools, Philadelphia
Pittsburgh Arithmetic Scale (Guy)	3-9	Public School Publishing Company, Bloomington, Illinois
Plymouth Arithmetic Tests	9-8	Plymouth Press, Chicago
Price Diagnostic Test of Processes of Working with Com- plex Fractions	6-8	Board of Education, Emd, Oklahoma
Reavis-Bresch Diagnostic Tests in the Fundamental Operations of Arithmetic and in Problem Solving	7-9	University of Chicago Press

MATHEMATICS (Continued)

Test	Grades or Ages	Postmaster
Rogers Test for Diagnosing Mathematical Ability	9	Bureau of Publications, Teachers College, Columbia University, New York
Schaeffer-Clark-Potter Arithmetic Test	6-12	World Book Company, Yonkers-on-Hudson, New York
Spencer Diagnostic Tests in Arithmetic	Elementary	Bureau of Administrative Research, University of Cincinnati
Standard Achievement Test- Arithmetic Examination	2-8	World Book Company, Yonkers-on-Hudson New York
Stevens Arithmetic Problem Analysis Test	4-8	Public School Publishing Company, Bloomington, Illinois
Wilson General Survey Tests in Arithmetic	5-7	University Publishing Company, Lincoln, Nebraska
Wisconsin Inventory Tests in Arithmetic (Osburn)	2-8	Public School Publishing Company, Bloomington, Illinois
Witham Standard Arithmetic Tests	4-9	J L Hammett Company, Newark, New Jersey
Woody Arithmetic Scales Series A and Series B	2-8	Bureau of Publications, Teachers College, Columbia University, New York
Woody-McCall Mixed Fundamentals in Arithmetic	3-8	Bureau of Publications, Teachers College, Columbia University, New York

READING

Test	Grades on Acorn	Publisher
Bolton Diagnostic Tests for Second- and Third-Grade Reading	2-3 1	Houghton Mifflin Company, Boston
Bruchner-Heylman Diagnostic Reading Test		Board of Education, Minneapolis, Minnesota
Burgess Scale for Measuring Ability in Silent Reading	Elementary	Russell Sage Foundation, New York
Chapman-Cook Speed of Reading Test	4-8	J B Lippincott Company, Philadelphia
Chapman Unspeeded Reading Comprehension Test	5-12	J B Lippincott Company, Philadelphia
Courts Research Tests in Silent Reading. Series R, Test 2	Elementary	S A Courts, Detroit, Michigan
Denver Diagnostic Reading Tests (Greene-Noar)	3-6	Public Schools, Denver, Colorado
Detroit Reading Test	2-9	World Book Company, Yonkers-on- Hudson, New York
Detroit Word Recognition Test	1-3	World Book Company, Yonkers-on- Hudson, New York
Fordyce Scale for Measuring Achievements in Reading	3-9	Bureau of Measurements and Re- search, Lincoln, Nebraska
Gates Diagnostic Tests in Reading	Elementary	Bureau of Publications, Teachers College, Columbus University, New York
Gates Graded Word Pronunciation Test	1-6	Bureau of Publications, Teachers College, Columbus University, New York

READING (Continued)

Type	Grades on Ages	Publisher
Gates Primary Reading Tests	1-8	Bureau of Publications, Teachers College, Columbia University, New York
Gates Silent Reading Tests	3-8	Bureau of Publications, Teachers College, Columbia University, New York
Gray Oral Reading Paragraphs	Elementary	Public School Publishing Company, Bloomington, Illinois
Gray Silent Reading Tests	3-8	Public School Publishing Company, Bloomington, Illinois
Gray Standardized Oral Reading Check Tests	Elementary	Public School Publishing Company, Bloomington, Illinois
Hagerty Reading Examination: Sigma 1 . . . Sigma 3.	1-8 6-12 3-8	World Book Company, Yonkers-on- Hudson, New York J B Lippincott Company, Philadel- phia
Los Angeles Elementary Reading Tests (Ingraham)	3-8	Research Service Company, Los Angeles, California
Los Angeles Primary Reading Test (Ingraham)	1-8	Research Service Company, Los Angeles, California
Los Angeles Primary Word Recognition Test	1-3	Research Service Company, Los Angeles, California

Minneapolis Primary Reading Test	1	Minneapolis Board of Education and Educational Test Bureau, Minneapolis, Minnesota
Monroe Standardized Silent Reading Tests I, II, III	2-12	Public School Publishing Company, Bloomington, Illinois
New Stanford Achievement Test: Reading	2-9	World Book Company, Yonkers-on- Hudson, New York
Pressay Diagnostic Reading Tests	2-9	Public School Publishing Company, Bloomington, Illinois
Pressay Diagnostic Vocabulary Test	1-3	Public School Publishing Company, Bloomington, Illinois
Pressay First-Grade Attainment Scale in Reading	1	Public School Publishing Company, Bloomington, Illinois
Ram and Bear Reading Test	2	Minneapolis Board of Education and Educational Test Bureau, Minneapolis, Minnesota
Sangren-Woody Reading Test	4-8	World Book Company, Yonkers-on- Hudson, New York
Stanford Achievement Test: Reading Examination	2-9	World Book Company, Yonkers-on- Hudson, New York
Starch Silent Reading Test	1-8	University Cooperative Company, Madison, Wisconsin
Stowe Narrative Reading Tests	2-9	Public School Publishing Company, Bloomington, Illinois
Thornthike Test of Word Knowledge	4-9	Bureau of Publications, Teachers College, Columbia University, New York

READING (Continued)

Test	Grades on Axis	Publisher
Thorndike-McCall Reading Scale	2-12	Bureau of Publications, Teachers College, Columbia University, New York
Van Wageningen Reading Scale	5-12	Public School Publishing Company, Bloomington, Illinois
Witham Silent Reading Test	4-12	J L Harcourt Company, Newark, New Jersey
Woody Silent Reading Test	4-12	Bureau of Publications, Teachers College, Columbia University, New York

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SPELLING

Test	Grades on Axis	Publisher
Ayres Spelling Scale Buckingham Extension of the Ayres Scale Courtis Standard Research Tests in Spelling Iowa Dictation Exercise and Spelling Test (Ashbaugh)	Elementary Elementary Elementary 3-8	Russell Sage Foundation, New York Public School Publishing Company, Bloomington, Illinois S A Courtis, Detroit, Michigan University of Iowa, Iowa City

Iowa Spelling Scales (Ashbaugh)	2-8	Public School Publishing Company, Bloomington, Illinois
Monroe Timed Sentences Spelling Tests	2-8	Public School Publishing Company, Bloomington, Illinois
Morrison-McCall Spelling Scale	2-8	World Book Company, Yonkers-on- Hudson, New York
Sixteen Spelling Scales (Boggs-Kelley)	7-12	Bureau of Publications, Teachers College, Columbia University, New York
New Standard Achievement Test Dictation Exercise	2-8	World Book Company, Yonkers-on- Hudson, New York
Starch Spelling Scale	All	University Cooperative Company, Madison, Wisconsin
Starch Spelling Test	Elementary	Macmillan Company, New York
Van Wagenen Scales for Measuring Individual Achievement in Spelling	2-8	Public School Publishing Company, Bloomington, Illinois

HANDWRITING

Test	Grades or Ages	Publisher
Artes Measuring Scale for Handwriting (Gettysburg Education)	Elementary	Russell Sage Foundation, New York
Clark-Wells-Freeman Handwriting and Measuring Tablets	2-8	Deboon-Evans Company, Columbus, Ohio

HANDWRITING (Continued)

Year	Grades or Ages	Publishers
Conard Manuscript Writing Standards	Elementary	Bureau of Publications, Teachers College, Columbia University, New York
Conner Muscular Movement Penmanship Gradient	1-8	Houghton Mifflin Company, Boston
Courts Standard Practice Tests in Handwriting (Courts- Shaw)	3-8	World Book Company, Yonkers-on- Hudson, New York
Courts Standard Research Tests in Handwriting	3-8	S. A. Courts, Detroit, Michigan
Courts Standard Supervisory Tests in Writing	3-8	S. A. Courts, Detroit, Michigan
Fordyce Directions for Measuring the Quality and Speed in Handwriting	3-8	Extension Division, University of Nebraska, Lincoln, Nebraska
Freeman Chart for Diagnosing Faults in Handwriting	All	Houghton Mifflin Company, Boston
Kansas City Scale for Measuring Handwriting (Mason Edition)	3-8	Bureau of Research and Efficiency, Public Schools, Kansas City
Luiter-Meyers Handwriting Scales	Elementary	Macmillan Company, New York
New York City Penmanship Scale	4-8	Macmillan Company, New York
Palmer Standards for the Evolution of Efficiency	1-8	A. N. Palmer Company, Chicago
Pressey Chart for Diagnosis of Difficulties in Handwriting	All	Public School Publishing Company, Bloomington, Illinois
Starch-Whee Measuring Scale for Handwriting	1-6	University Cooperative Company, Madison, Wisconsin

Thorndike Handwriting Scale	2-8	Bureau of Publications, Teachers College, Columbia University, New York
West Chart for Duplicating Elements in Handwriting	Elementary	Public School Publishing Company, Bloomington, Illinois
Winzler Manuscript Writing Scale (Experimental Edition)	Elementary	Harcos Mann School, Winnetka, Illinois
Zaner Handwriting Scales and Standards	Elementary and high school	Zaner and Bloer Company, Columbus, Ohio

SOCIAL SCIENCE

Test	Grades or Ages	Publisher
Barr Diagnostic Test in American History	8-12	Public School Publishing Company, Bloomington, Illinois
Brown-Woody Civics Test	7-12	World Book Company, Yearbook-on-Hudson, New York
Buckingham-Sterneron Place Geography Tests	5-8	Public School Publishing Company, Bloomington, Illinois
Buckingham-Sterneron Information-Problems Tests United States, South America, Europe, and Asia	5-9	Public School Publishing Company, Bloomington, Illinois
Burton Civics Test	5-9	World Book Company, Yearbook-on-Hudson, New York

SOCIAL SCIENCE (Continued)

Test	Grades or Ages	Publisher
Courts Standard Supervisory Test in Geography	Elementary 7-8	S. A. Courts, Detroit, Michigan
Denny-Neison American History Test		
Gregory Tests in American History	7-12	World Book Company, Yonkers-on-Hudson, New York
Gregory-Maggey Geography Tests	4-6	Bureau of Administrative Research, University of Cincinnati
Gregory-Spencer Geography Test	4-8	C. A. Gregory, University of Cincinnati, Cincinnati, Ohio
Hahn History Scale	7-8	Bureau of Administrative Research, University of Cincinnati
Hahn-Lackey Geography Scale	4-8	Public School Publishing Company, Bloomington, Illinois
Harlan Test for Information in American History	7-8	Public School Publishing Company, Bloomington, Illinois
Hill Tests in Civic Information and Attitudes	6-12	Public School Publishing Company, Bloomington, Illinois
Iowa General Information Test in American History	7-12	Public School Publishing Company, Bloomington, Illinois
Junior American History Test	7-9	Bureau of Educational Research and Service, University of Iowa, Iowa City
		World Book Company, Yonkers-on-Hudson, New York

Plymouth Educational Tests, United States History. Nos 80A, 81A, 82A	6-8	Plymouth Press, Chicago
Posey-Van Wageningen Geography Scales	4-8	Public School Publishing Company, Bloomington, Illinois
Pressey-Richards American History Test	6-12	Public School Publishing Company, Bloomington, Illinois
Van Wageningen American History Scales	5-12	Bureau of Publications, Teachers College, Columbia University, New York
Witham Comprehensive History Test	7-8	J L Hammett Company, Newark, New Jersey
Witham Standard Geography Test	5-12	J L Hammett Company, Newark, New Jersey

FINE ARTS

Test	Grades on Axis	Publisher
Beach Music Test	Elementary — college 4-5	Kansas State Teachers College, Emporia, Kansas
Hilbrand Sight-Singing Test.		World Book Company, Yonkers-at- Hudson, New York
Hutchinson Music Test	7-12	Public School Publishing Company, Bloomington, Illinois
Kline-Carey Measuring Scale for Freehand Drawing	All	Johns Hopkins University Press, Baltimore

FINE ARTS (Continued)

Test	Grades or Ages	Personnel
Kuhlwaser Test of Music Information and Appreciation	High school 4-12	University of Iowa, Iowa City Extension Division, University of Iowa, Iowa City
Kuhlwaser-Ruch Test of Musical Accomplishment	9-12	Research Publishing Company, Los Angeles, California
Lewerenz Test in Fundamental Abilities of Visual Art	All	Bureau of Publications, Teachers College, Columbia University, New York
Maddory Art Test	Primary	Williams and Wilkins, Inc., Balti- more
McCarthy Drawing Scale	All	Bureau of Educational Research, University of Iowa, Iowa City
Meier-Seashore Art Judgment Test	4-9	Bureau of Publications, Teachers College, Columbia University, New York
Moeber Individual Singing Test (In Contributions to Edu- cation, No. 194, pages 64-73)	4-9	State Normal School, New Haven, Connecticut
Moeber Sight Reading Music Test	4-12	Bureau of Publications, Teachers College, Columbia University, New York
Music Achievement Test (Goldsmith)	4-12 5-8	S. A. Courtis, Detroit, Michigan Plymouth Press, Chicago
Peabody-Easley Recognition of Characteristic Rhythms Plymouth Educational Tests: No. 110A (Key signatures)		

<p>Seashore Measures of Musical Talent Thornike Scale for General Merit of Children's Drawings Torgerson-Fahnestock Music Tests</p>	<p>All Ages 9-15 4-9</p>	<p>Silver, Burdett & Co., New York Bureau of Publications, Teachers College, Columbia University, New York Public School Publishing Company, Bloomington, Illinois</p>
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FOREIGN-LANGUAGE APTITUDE

Test	Grades or Ages	Publishers
<p>Handchen Predetermination Test Lana-Orleans Modern Language Progress Test Sprengle Foreign Language Progress Test</p>	<p>Secondary schools 7-college Junior and senior high school</p>	<p>United States Bureau of Education, Washington, D C World Book Company, Yonkers-on- Hudson, New York Bureau of Publications, Teachers College, Columbia University, New York</p>

SCIENCE

Test	Grades or Ages	Purchasers
Downing Range of Information Test in Science	High school	E. R. Downing, University of Chicago Bookstore
Dorrick General Science Tests	High school	Public School Publishing Company, Bloomington, Illinois
Powers General Science Test	7-9	Bureau of Publications, Teachers College, Columbia University, New York
Reich-Popewell General Science Test	7-9	World Book Company, Yorktown-es- Hudson, New York

HOUSEHOLD ARTS AND HEALTH INFORMATION

Test	Grades or Ages	Purchasers
Gates-String Health Knowledge Test	8-12	Bureau of Publications, Teachers College, Columbia University, New York
Health Education Tests	8-9	American Child Health Association, New York

Home Economics Information Tests	8-9	Bureau of Publications, Teachers College, Columbia University, New York
Illinois Food Test	High school	Public School Publishing Company, Bloomington, Illinois
King-Clark Foods Test	8-12	World Book Company, Yonkers-on-Hudson, New York
Murdoch Analytic Sewing Scale for Separate Stitches	All	Bureau of Publications, Teachers College, Columbia University, New York
Murdoch Sewing Scale	8-12	Bureau of Publications, Teachers College, Columbia University, New York
Stevenson-Trilling Test in Comprehension of Patterns	6-12	Public School Publishing Company, Bloomington, Illinois
Williams-Knepp Scale for Measuring Skill in Machine Sewing	Elementary and high school	Department of Education, University of Chicago

CLERICAL, MECHANICAL APTITUDE, MOTOR SKILL

Test	Grades on Aids	Publisher
Brace Motor Tests (In <i>Measuring Motor Ability</i> , by D. K. Brace)	All	A. S. Barnes & Co., New York
Detroit Mechanical Aptitudes Examinations (Boys' Test, Girls' Test)	Junior and senior high school Ages 16 and over	Public School Publishing Company, Bloomington, Illinois
Macquarrie Test for Mechanical Ability		Research Service Company, Los Angeles, California
O'Rourke Series of Aids in Placement and Guidance	7-adult	Educational and Personnel Publishing Company, Washington, D. C.
Patrick Industrial Arts Test	7-9	Public School Publishing Company, Bloomington, Illinois
Stenquist Assembling Tests of General Mechanical Ability	3-12	C. H. Stenquist Company, Chicago
Stenquist Mechanical Aptitude Tests	6-12	World Book Company, Yonkers-on-Hudson, New York
Thurstone Employment Tests	High school	World Book Company, Yonkers-on-Hudson, New York
Thurstone Vocational Guidance Test	High school and college freshmen	World Book Company, Yonkers-on-Hudson, New York
Tripps Tests for Vocational Guidance of Children Thirteen to Sixteen	Ages 13-16	Bureau of Publications, Teachers College, Columbia University, New York

TESTS AND RATINGS OF CHARACTER, PERSONALITY, ENVIRONMENT

Test	Grades or Ages	Publisher
<p>Andrews Inventory of the Habits of Children from Two to Five Years of Age</p>	Ages 2-5	Bureau of Publications, Teachers College, Columbia University, New York
<p>Brotzman-Moral Concept Test</p>	High school and college	C. H. Stedding Company, Chicago
<p>Burdick Apperception Test for Measuring the Child's Cultural Background (In <i>Studies in Deceit</i>, page 387, by Hugh Hartshorne and Mark A. May)</p>	Upper elementary and high school	Macmillan Company, New York
<p>Cady Tests of Incomprehensibility (In "The Estimation of Juvenile Incomprehensibility," by Vernon Cady, in <i>Journal of Delinquency Monograph No. 5</i>, pages 133-140)</p>	Upper elementary and high school	Whittier State School, Whittier, California
<p>Downey Group Will-Temperament Test</p>	High school and adult	World Book Company, Yonkers-on-Hudson, New York
<p>Downey Individual Will-Temperament Test</p>	High school and adult	World Book Company, Yonkers-on-Hudson, New York
<p>Haggerty Undesirable Behavior Record (In "The Incidence of Undesirable Behavior in School Children," by M. E. Haggerty, in <i>Journal of Educational Research</i>, Vol. XII, pages 102-122)</p>	Elementary	Public School Publishing Company, Bloomington, Illinois

TESTS AND RATINGS OF CHARACTER, PERSONALITY, ENVIRONMENT (Continued)

Test	Grades or Ages	Publisher
Hagerty-Glass-Wickman Behavior Rating Schedules	Elementary	World Book Company, Yonkers-on-Hudson, New York
Hart Test of Social Attitudes and Interests (In <i>A Test of Social Attitudes and Interests</i> (Studies in Child Welfare, Vol. II, No. 4), pages 11-14, by H. N. Hart)	Upper elementary, high school, and adult	University of Iowa, Iowa City
Hartshorne-May Tests of Deception in School Children (In <i>Studies in Deceit</i> , pages 47-103, by Hugh Hartshorne and Mark A. May)	Elementary	Macmillan Company, New York
Interest Record (In <i>Genetic Studies of Genius</i> , Vol. I, pages 343-424, by Lewis M. Terman and Others)	Elementary	Stanford University Press, Stanford University, California
Kent-Rosanoff Association Test, Uncontrolled	Elementary and high school	C H Stoeckling Company, Chicago
Kohs Ethical Discrimination Test	High school and adult	C H Stoeckling Company, Chicago
Lehman Play Quiz	Elementary	University of Kansas, Lawrence, Kansas
Marston Extroversion-Introversion Tests (In <i>The Emotions of Young Children</i> (Studies in Child Welfare, Vol. III, No. 3), by Leslie B. Marston)	Elementary	University of Iowa, Iowa City

Mendenhall Character Rating Scales	3-8	E D Starbuck, University of Iowa, Iowa City
New York Rating Scale for School Habits (Cornell, Cora, Orleans)	1-9	World Book Company, Yonkers-on- Hudson, New York
Pressey Interest Questionnaire	5-12	Psychology Department, Ohio State University, Columbus, Ohio
Pressey X-O Test (Two forms — Adult and Juvenile)	Elementary and high school	C H Steeling Company, Chicago
Rachbeinamer Overstatement Tests (In <i>An Experimental Study of Some Behavior Traits of the Potentially Delin- quent Boy</i> (Psychological Monographs, Vol XXXIV, No 185), pages 22-27)	Elementary	Psychological Review Company, Princeton, New Jersey
Rogers Testature Inventory of Habits	Ages 5 and 6	Bureau of Publications, Teachers College, Columbia University
Sanger Information Tests for Young Children	Primary	World Book Company, Yonkers-on- Hudson, New York
Sims Score Card for Socio-Economic Status	Elementary and high school	Public School Publishing Company, Bloomington, Illinois
Smith's Park School Manual of Pupil Analysis	Elementary	Park School, Baltimore
Terman Trait Ratings: Physical, Mental, Social, and Moral (In <i>Genetic Studies of Genius</i> , Vol 1, pages 219-255, by Lewis M Terman)	Elementary	Stanford University Press, Stanford University, California
Upton-Chassell Scale for Measuring Habits of Good Cul- ture	Elementary	Bureau of Publications, Teachers College, Columbia University, New York

TESTS AND RATINGS OF CHARACTER, PERSONALITY, ENVIRONMENT (Continued)

Test	Grades or Ages	Publisher
Voeller Moral Conduct Test (In <i>The Functions of Ideals and Attitudes in Social Education</i> , page 196, by P. F. Voeller)	Ages 10-17	Bureau of Publications, Teachers College, Columbia University, New York
Whittier Scale for Grading Home Conditions (In <i>Journal of Delinquency</i> , Vol. 1, pages 471-488)	All	Whittier State School, Whittier, California
Williams Scale for Grading Neighborhood Conditions (In <i>Research Bulletin No. 2</i>)	All	Department of Research, Whittier State School, Whittier, California
Woodworth-Mathews Personal Data Sheet	Elementary and high school	C H Steadling Company, Chicago
Woodworth-Wells Association Tests	Elementary and high school	C H Steadling Company, Chicago

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